THE CHEMIST AND DRUGGIST

ESTAB. 1859

REGISTERED AS A NEWSPAPER

TELEPHONE: CENTRAL 3617
TELEGRAMS: "CHEMICUS, CANNON, LONDON" (2 Words)

PUBLISHED WEEKLY AT 42 CANNON ST., LONDON, E.C.4.

SUBSCRIPTION WITH DIARY 20/- PER ANNUM
SINGLE COPIES 9d.

No. 2426. AUGUST 7, 1926. Vol. CV.

OPOIDINE REGD

The British Preparation of the Total Alkaloids of Opium.

Also issued in combination with SCOPOLAMINE.

OPOIDINE produces the full effects of Opium, with the advantage that it contains the mixed active principles in uniform ratio, whilst in Opium the proportion varies greatly.

Prepared in Ampoules, Hypodermic and Oral Tablets, and Powder.

J. F. MACFARLAN & CO., Edinburgh and London.

ALKALOIDS
FINE CHEMICALS
OPIUM DERIVATIVES

SALICIN CAPSICIN CANTHARIDIN HYOSCYAMINE CHLOROFORM
SCAMMONY & JALAP RESINS VERATRINE ATROPINE EMETINE
ERGOTIN

MORPHINE CODEINE STRYCHNINE CAFFEINE ETC.

Goods covered by Dangerous Drugs Acts offered subject to all regulations.

T. & H. SMITH, LTD.

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Index to Advertisers, pp. 5 & 6.

W. J. BUSH & CO.

LIMITED

DISTILLERS OF

ESSENTIAL OILS

MANUFACTURERS OF

SOLUBLE and FRUIT ESSENCES

AND

FINE CHEMICALS

SPECIALITIES

ACETANILIDE, B.P. 1914 SALICYLIC ACID
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The "RED BALL" Brand

TRADE MARK IS SYNONYMOUS WITH TRUSTWORTHINESS & RELIABILITY

Pharmacist's enquiries for

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Estabd 1882

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IN THE **ADDIS** BLUE BOX

TOOTH BRUSHES

— ON THE —

P.A.T.A.

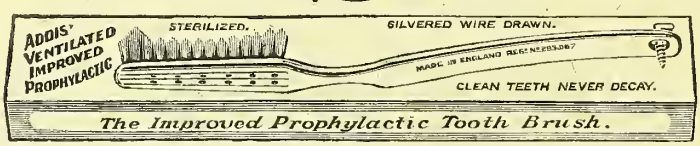
Price **2/6**

—

Price to Chemists **1/8**, or **1/6** in gross lots.

Reg. No. 593367.

Addis ESTB 1780 Prophylactic



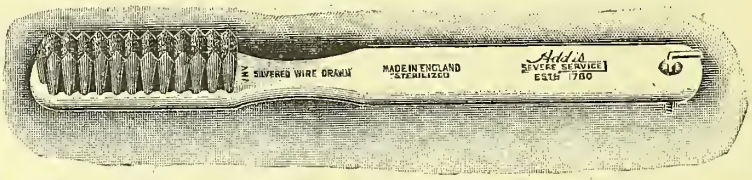
1/- Per Brush PROFIT.

Price **2/6**

—

Price to Chemists **1/8**, or **1/6** in gross lots.

Addis SEVERE SERVICE ESTB 1780



1/- Per Brush PROFIT.

MADE OF VERY HARD UNBLEACHED BRISTLES FOR SEVERE SERVICE.

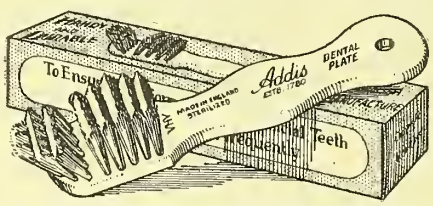
Price **2/6**

Price to Chemists **1/8**, or **1/6** in gross lots.

1/- Per Brush PROFIT.

Addis ESTB 1780

WINGED DENTAL PLATE



ONE CANNOT DISPUTE the fact that **ADDIS** Tooth Brushes are the best. The **Workmanship, Bristle** and **Packing** is superior to all other makes, and are **made to be used in Hot or Cold Water.**

MADE BY THE OLDEST FIRM OF TOOTH BRUSH MAKERS IN THE WORLD AND SUPPLIED THROUGH THE WHOLESALE HOUSES.

GROSS LOTS CAN BE MADE UP OF ALL ABOVE LINES.

Write us direct for particulars of Show Cases and Advertising Matter.

ADDIS, Brush Works, HERTFORD, England

Heppells Ltd

164 Piccadilly, W.1

Have you a showcard as below?

THIS ELEGANT SHOWCARD IN COLOUR SUPPLIED.

SIZE 10½ × 8½

A SUPPLY OF COUNTER LITERATURE PROVIDED.

WHOLESALE PRICE 10/- DOZ.

Clarks' Thinning Bath Salts

ARE BEING LARGELY ADVERTISED. DON'T LOSE BUSINESS.

A safe, reliable, and elegant home treatment for obesity. It will appeal to your customers, and it will pay you to stock it.

It retails at **1s. 3d. per packet**

Sole Proprietors for Great Britain and the Colonies:

Heppells Ltd

164 PICCADILLY LONDON - W.1

NATIONAL HEALTH INSURANCE DRESSINGS

B.P.C. JULY, 1925, STANDARD.

BANDAGES.

	4 yd. × 2 in.	2½ in.	3 in.
Calico, bleached, per gross ..	23/–	29/–	35/–
Calico, unbleached per gross ..	21/–	27/–	32/–
Crepe, 33% Wool,	2½/2¾ yd. × 2 in.	2½ in.	3 in. 3½ in.
per dozen	7/3	9/3	11/– 13/6

	6 yd. × 2½ in.	3 in.
Domette, per dozen	7/3	8/9

	4 yd. × 2½ in.	6 yd. × 3 in.
Flannel, per dozen	10/–	17/3

Open Wove, White — per gross

3 yards × 1 in.	6/–
4 ,, × 1½ in.	11/–
4 ,, × 2 in.	14/–
4 ,, × 2½ in.	17/3
4 ,, × 3 in.	20/9
6 ,, × 4 in.	40/9
6 ,, × 6 in.	61/6

	5 yd. × 3 in.	4 in.
Plaster of Paris, per dozen	18/–	23/6

BORIC LINT.

	1 oz.	2 oz.	4 oz.	8 oz.	1 lb.
per lb. ..	2/4	2/2	2/–	1/10	1/9

BORIC WOOL.

	1 oz.	2 oz.	4 oz.
per lb.	2/8	2/6	2/4

COTTON WOOL.

	½ oz.	1 oz.	2 oz.	4 oz.	8 oz.	1 lb.
per lb.	2/9	2/4	2/2	2/–	1/10	1/9

GAUZE TISSUE.

	1 oz.	2 oz.	4 oz.	8 oz.	1 lb.
per lb.	2/7	2/5	2/3	2/1	2/–

GUTTA PERCHA TISSUE. per yard 1/3

JACONET. 42/44 in. wide, per yard 1/11

LINT. Unmedicated.

	1 oz.	2 oz.	4 oz.	8 oz.	1 lb.
per lb. ..	2/10½	2/7½	2/6	2/5	2/4

OILED CAMBRIC. 36 in. wide, per yard 1/8

OILED PAPER. 20 × 30 in., per dozen 1/–

OILED SILK. 36 in. wide, per yard 3/3

STANDARD DRESSINGS.

	No. 1	No. 2
per dozen	2/4	3/9
per gross	27/–	42/–

TOW.

	½ lb.	1 lb.
Plain, per dozen	4/–	7/–
Carbolised	5/6	8/6

GAUZES.

	Per dozen packets	6 yards	3 yards	1 yard.	½ yard	¼ yard.
Unmedicated		11/3	5/9	2/1	1/2	8½d.
Boric 10%—15%						
Carbolic 5%—6%		12/–	6/6	2/3	1/5	10d.
Double Cyanide, 2% —3%						
Iodoform, 4%—5%						
Picric, 1½%—2%		16/–	8/9	3/–	1/6	11d.
Sal. Alembroth, ¾%—1%						
Sublimate, 1%—15%		12/–	6/6	2/3	1/5	10d.

BUTLER & CRISPE

80-82 CLERKENWELL ROAD, LONDON, E.C.1

INDEX TO ADVERTISERS

[*Continued overleaf.*

OLDFIELD, PATTINSON & CO.

TELEGRAMS: "OPIUM MANCHESTER"

TELEPHONES: CITY 984 & 4038

Reliable House for all Pharmaceutical Preparations

Concentrated Waters.

Concentrated Infusions.

Essential Oils.

OPIUM

B.P. Tinct. Aqueous Tinct.

Liquid Extracts.

Levigated Ointments.

Syr. Glycerophos. Co.

"Silver Churn" Dairy Specialities.

MANCHESTER.

Three Links

SECTO ADVERTISING YOU

THAT MEAN

MORE BUSINESS.

"SECTO" 1926 ADVERTISING HAS COMMENCED.

Since this season's advertising campaign commenced we have already received many orders direct from the public stating that they are unable to obtain supplies from their local chemist.

WE WANT *YOU* TO SUPPLY

The "Secto" message is REPEATED in the Press over

5,000,000 TIMES WEEKLY

SALES increase so far this year—90% over 1925—and LAST YEAR WAS A RECORD.

RETAIL 4d.	COSTING 3/-			
„ 6d.	„ 4/3	per doz.	With 1 doz. assorted Bonus with 1 gross.	
„ 1/-	„ 8/6	less 10%		
„ 3/-	„ 27/-	28 days.	„ 6 „ „ „ „ 5 „	
„ 5/-	„ 42/-			

ORDER NOW.

CUPAL, LTD.
BLACKBURN.

TRADE MARK

AN ALL-THE-YEAR-ROUND SELLER

For summer's sun
and winter's wind,

Spurway's

LEMON CREAM

For the Hands

A non-greasy cream which has a wonderful effect in softening and whitening the skin, and in preventing excessive perspiration.

It is exquisitely perfumed and leaves a delightful after-aroma on the hands.

Sent out in dainty 4-oz. frosted bottles, fitted with glass-top corks covered with transparent viscose caps and artistically labelled.

Handsome show-cards sent with each consignment.

PRICES—

1 doz. lots **12/-** per doz.
3 doz. lots **11/-** ,,

SPURWAY ET CIE, LTD.

89 Great Eastern Street,
LONDON :: :: E.C.2.

CANNES-GRASSE, RIVIERA.
PARIS.

LEIPSIC NEW YORK
KINGSTON (ONTARIO)

Telegrams - "NEROLI, LONDON."
Telephone - - BISHOPSGATE 1372.

THE STANDARD **D & O** OF QUALITY
BRAND

AMERICAN ESSENTIAL OILS

GENUINE AMERICAN PEPPERMINT OIL

Natural : finest single distilled. Prismentha : re-distilled. Supermentha : rectified.

OILS OF NUTMEG, COPAIBA, SASSAFRAS, CEDARWOOD, SPEARMINT, WORMSEED. BALSAMS: PERU, COPAIBA, TOLU.

Dodge & Olcott Co.
20 Mark Lane, London, E.C. 3.

'Phone : Royal 3102/3. Wires : "Egdarf, Fen, London."

Head Office : 87 Fulton St., New York.

CHEMICAL WORKS

"FLORA"

DUBENDORF, ZURICH - SWITZERLAND.

Manufacturers of

ARTIFICIAL MUSKS

100%

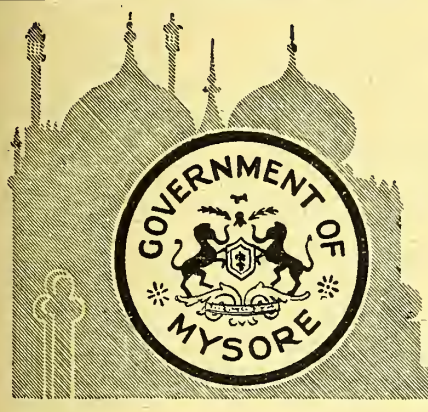
AMBRETTE
KETONE XYLOL

The "Flora" Musks are the essence of perfection, and striking examples of a factory with a large reputation for quality.

LONDON STOCKS

Samples and Prices from—

CHAS. ZIMMERMANN & CO. (Chemicals), LTD.
33 St. Mary-at-Hill, London, E.C.3



Mysore Government Seal is your guarantee that the Oil is the finest in the World

EAST INDIAN

SANDALWOOD OIL

Sole European Distributors:

ESSENFLOUR PRODUCTS LTD.

"Perfume House" 6, 7 & 8 BEAUCHAMP STREET, LONDON, E.C.1

Telephone: HOLBORN 2499, 6214, 6215 (3 lines). Telegrams: "EKDUM, LONDON."

ESSENCES & SYNTHETICS, LTD.

WM. C. SLATER,
Managing Director.
ROYAL 290.

4 Carlisle Avenue,
E.C.3.
"ESSYNTHET, ALD, LONDON."

NEW CROP

OTTO OF ROSE

GUARANTEED PURE AND DISTILLED BY

BOTU PAPPAZOGLOU & CIE, Kazanlik

NOW AVAILABLE.

PLEASE WRITE FOR PRICES AND SAMPLES.

Parfums d'Héraud

We have been fortunate enough to secure the sole agency for these magnificent Perfumes.

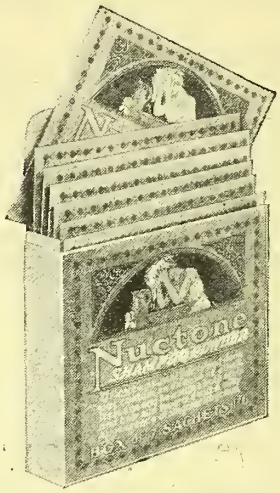
They are put up in unusually attractive "flacons" packed in delightful boxes.

The Perfumes include Oregan, Ambre, Chypre, Œillet, Muguet, Violette, Heliotrope, Lilas and Jasmin.

There are also Lotions, Eaux de Toillette, Eaux de Cologne, Poudres de Riz and Talcs to match.

We can supply a Miniature Size Perfumes, beautifully packed in Cartons containing 6 Bottles, at 8/6 per doz.
The regular Bottles range from 63/- per doz. to 120/- per doz.

WILLIAM EDWARDS & SONS
Wholesale Druggists' Sundriesmen,
14-18 NILE STREET, CITY ROAD, LONDON.



The Nuctone Shampoo pack which is beautifully printed in colours.
Grades: Nuctone, Nuctone Henna, Nuctone Pine, Nuctone Camomile.

Bigger Shampoo Profits

There are years of experience in high-class hairdressing behind the Nuctone Shampoo. It has been in use for many years in a famous Bond Street Salon, and wherever it is introduced repeat Sales follow with certainty—yet it shows you a quite exceptional profit. A special window display bonus of one box with every dozen ordered will be given with all orders received during August. Nuctone Shampoos help to sell Nuctone for grey hair and vice versa. Take this opportunity of putting in a real money-making line.

Nuctone
SHAMPOO POWDER

TERMS: Nuctone Shampoo (3d. retail) 1/8½ per doz. (P.A.T.A.) Box of 7 (1/6 retail) 12/- per doz. boxes. Nuctone Henna, Pine and Camomile (4d. retail), 2/- per doz. Box of 7 (1/9 retail) .. 14/- per doz. boxes.

Display Bonus of 1 box to every dozen boxes.

NUCTONE FOR GREY HAIR. IN FOUR GRADES:

NUCTONE for dark and medium hair.
NUCTONE ECLAIRE for fair and auburn hair.
3/9 size .. **32/-** doz. 6/6 size .. **52/-** doz.
NUCTONE CONCENTRE for quicker results for dark hair.
NUCTONE ECLAIRE CONCENTRE for quicker results for fair hair.
6/6 size .. **52/-** doz. 12/6 size .. **84/-** per doz.

Obtainable from your usual wholesalers or direct from—

J. C. GAMBLES & Co., Ltd.
211/215 Blackfriars Road
LONDON - - S.E.1

Manufactured by—
STEWART, GOODALL & DUNLOP, LTD.
4 Dering Street - - - London, W.1

Maw's Page

Selling a "Meritor" Tooth-Brush is a Matter of Seconds.

Your modern man and woman do not expect to spend five or ten minutes on the purchase of a tooth-brush—they have other things to do. But they expect to receive a tooth-brush which will do its work thoroughly. They expect, probably without knowing it, to receive a "Meritor" tooth-brush.

With the "Meritor" tooth-brush display case on your counter, you can give them exactly the brush they want, properly packed, in a few seconds.

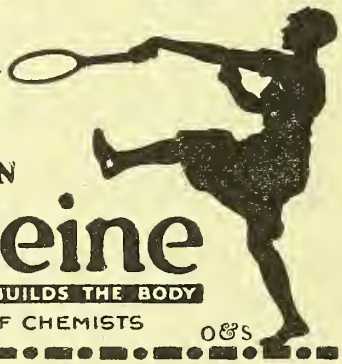
The old method of stocking and displaying tooth-brushes is finished with. In the "Meritor" tooth-brush display case you have the means of displaying a complete range of the finest tooth-brushes it is possible to sell, in such a manner that your customer can almost select a brush at a glance. If he must inspect the brush more closely it can be taken from the case instantly and placed in his hand. A decision come to, you take the prototype of the brush selected, packed in its neat and striking carton, from the back of the case and hand it over your counter. The transaction has taken about thirty seconds. You have gained a profit of 50 per cent. and secured a "Meritor" customer; a customer who will want another tooth-brush at some time, and who will remember the name "Meritor" when requiring other brushes for the toilet.

The "Meritor" tooth-brush display case is a willing worker. Keep it hard at work all day, every day, and watch your tooth-brush sales!

S. Maw, Son & Sons, Ltd.,
Aldersgate St., London,
and Barnet.

TRADE MARK

If you would know the joy of Fitness – PUT YOURSELF ON



Roboleine

THE FOOD THAT BUILDS THE BODY

2/-, 3/6, 6/-, & 15/-, OF CHEMISTS O&S

WE ARE KEEPING

Roboleine

THE FOOD THAT BUILDS THE BODY

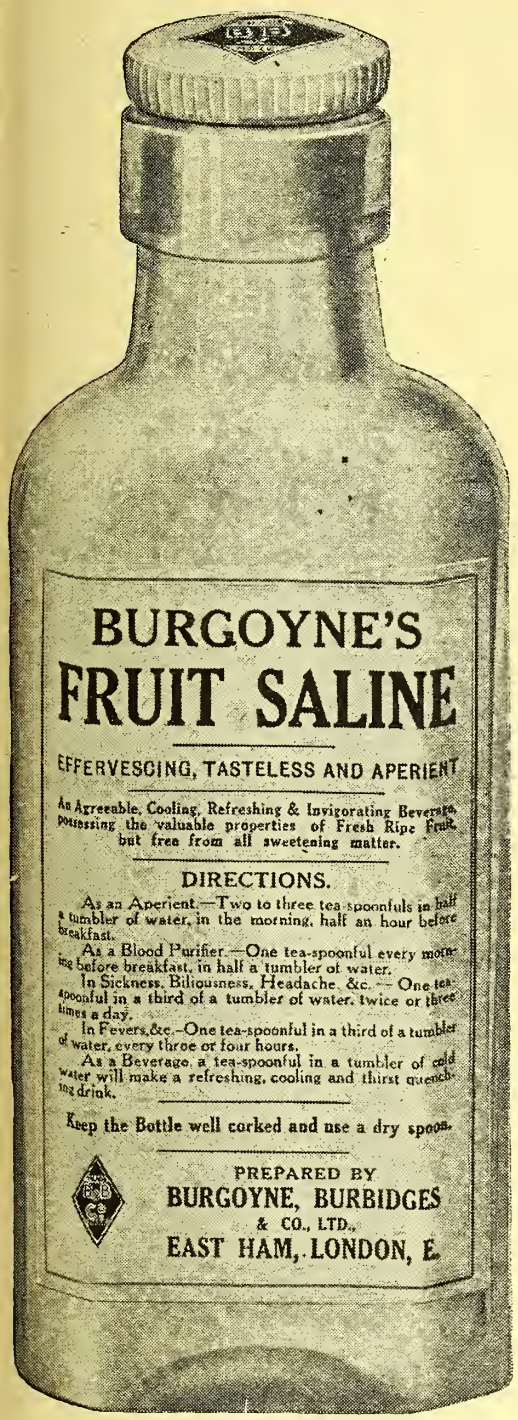
TO THE FORE

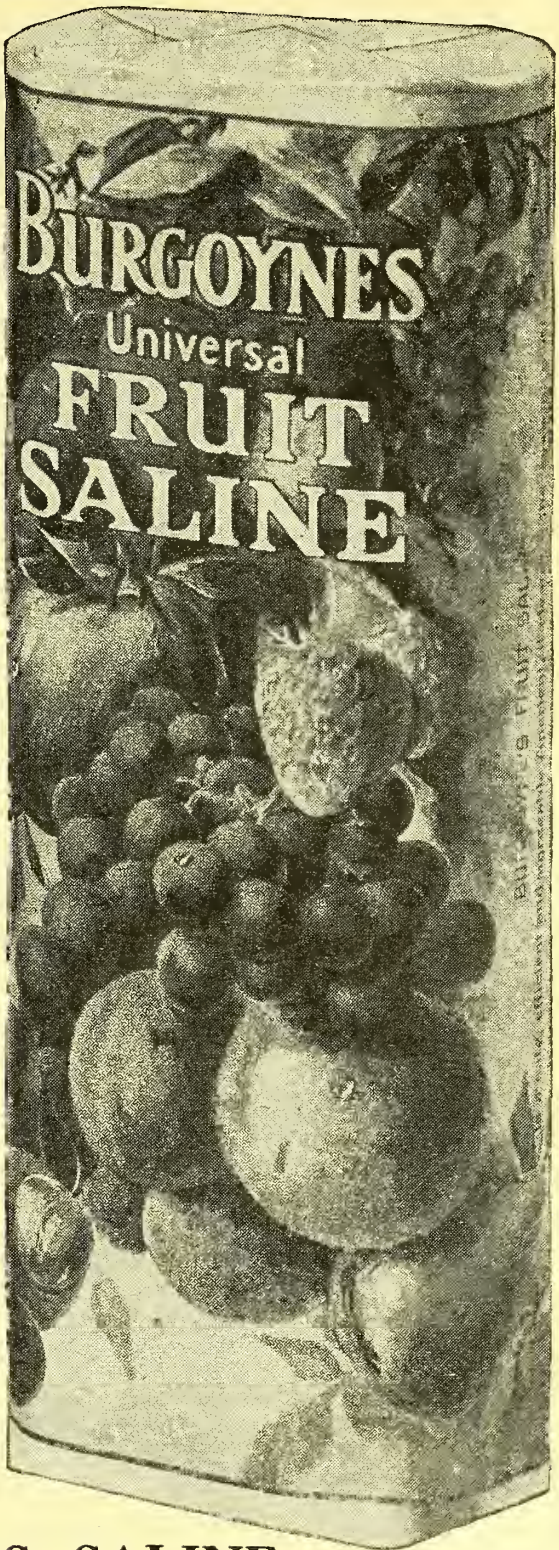
during the Summer Months and your sales of this fine product will no doubt be stimulated. Summer colds are often obstinate things to get rid of, and holidays sometimes do more harm than good, because people have a surfeit of strenuous exercise without taking any more energising food than usual.

Gain the Goodwill of your Customers by recommending Roboleine.

OPPENHEIMER, SON & COMPANY LTD.
179 Queen Victoria Street, London E.C. 4.

O & S





BURGOYNE'S SALINE

HIGHEST QUALITY : LOWEST PRICE : GROWING DEMAND

Lysol
Reg^d Trade Mark

CONFIDENCE

MARSHALL'S LYSOL is manufactured with care and precision, and in a manner bestowed upon no other Lysol. It contains the full percentage of free cresols necessary for thorough disinfection. There are no impurities or irritant matter to harm the delicate tissues, no free alkali to burn the sensitive membranes. It is always consistent and is an acknowledged standard for Lysol. You can recommend Marshall's Lysol confidently in the knowledge that it alone possesses qualities which distinguish it from its many imitations.

Manufactured by
LYSOL Ltd. RAYNES PARK, S.W.20

Marshall's
LYSOL
DISINFECTANT

Selling briskly now for HAY FEVER

DISPELLO CATARRH SNUFF sells freely all the year round. Just now when Hay Fever claims many victims it is beginning its boom and sales are rapidly rising. Come October we shall be claiming record sales, but we know these will again be beaten in the 'peak' months of January and February.

As a professional man

look at the formula and you will understand why the public recommend DISPELLO to their friends.

WINDOW DISPLAY FREE WITH ONE GROSS.

Per dozen	...	...	...	4/6
Per gross	...	...	...	48/-

Samples sent on request.

Special Packings for Export. *Prices on application.*

AYRTONS

for Packed Goods

LIVERPOOL

"JOHN BULL"

MALT EXTRACT MALT AND OIL

NOTED FOR PURITY, PALATABILITY AND REGULARITY

Made Only and Entirely from THE FINEST BARLEY MALT and the BEST LOFOTEN COD LIVER OIL

SUPPLIED IN BULK, JARS, TINS AND CARD-: BOARD CONTAINERS :

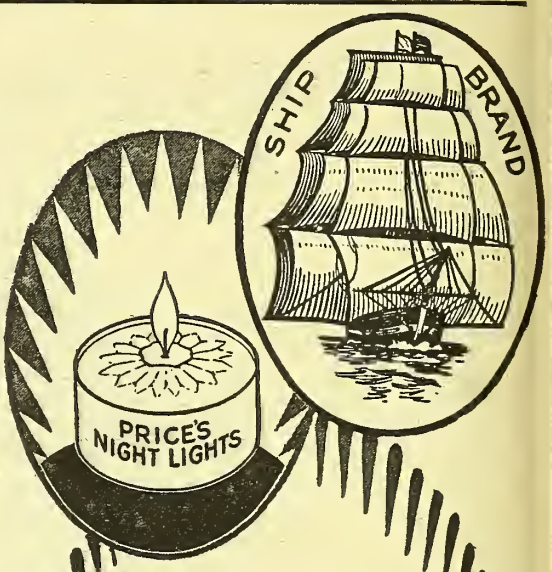
Guaranteed not to Crystallise or Ferment

WHOLESALE & EXPORT ENQUIRIES INVITED.

PAINE

& CO., LIMITED

ST. NEOTS - - HUNTS, England



Most chemists now stock PRICE'S NIGHTLIGHTS —do you?

Dealers who make the experiment find that Price's Night Lights are as essential a part of their trade as baby foods and hot-water bottles.

Customers who buy for young children, and thousands of older people as well, are buyers of Price's Night Lights.

Here is a line that yields you a good profit on outlay. A staple sure seller, and backed by nearly a century of pre-eminence.

Give Price's Night Lights a chance in your business

PS 10 130

PRICE'S NIGHT LIGHTS

PRICE'S PATENT CANDLE CO. LTD.

Battersea, London, S.W.11

The World's Foremost Makers of Candles and Night Lights for nearly a century

The BRITISH Local Anæsthetic

THE complete series of chemical processes needed for the production of pure *p*-Amino-Benzoyl-Diethyl-Amino-Ethanol Hydrochloride (Kerocain) was worked out in our own Laboratories during the early years of the war, in collaboration with the research department of the University of St. Andrews.

During the war millions of injections of Kerocain were supplied to the medical services of the various allied armies without a single complaint, and in the peace years there has been a steadily growing recognition of the merits of Kerocain on the part of the medical and dental professions.

Free from Cocaine

Kerocain

Kerfoot's Novocain

Unaffected by D.D.A.

Is available in powder and also in the form of tablets and solutions, in various strengths, alone and in combination with Adrenalin. For surgical use Kerocain "A" and "B" are convenient, whilst one of the most popular preparations with the dental profession is Kerocain "E" with Adrenalin, in sterile isotonic solution.

For list see "Fine Chemicals" section in our current Price List (page 22). Fuller particulars on request.

B/462

THOMAS KERFOOT & Co LTD.
BARDSLEY VALE, LANCASHIRE,
& Bardsley House, London, N.1
ESTABLISHED 1797.

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PACKED
TOILET AND PHARMACEUTICAL PREPARATIONS

8/- PER DOZ.

We have a reputation for quality, and are unrivalled for the packing of High Class lines at moderate prices.

Send us your enquiries for all packed Toilet and Pharmaceutical Preparations. Satisfaction Guaranteed.

Illustrated Catalogue upon application.

JULES FRÉRES LTD.
LONDON, S.E.17

8/- PER DOZ.

RÉNÉ POMADE HONGROISE
SHOULD BE STOCKED BY ALL CHEMISTS

Sixpenny Size 3/- per doz.

Ninepenny Size 4/- per doz.

N. STECKLYN & SONS
Chemists, Sundriesmen & Perfumers,
30 Dean Street, Soho, W.1. Tele. No.: Regent 3642.
17 Houndsditch, E.1. Tele. No.: Ave. 8121.

PERFUME SPRAYS

When you see the small purple and gold "B.G." Seal on a perfume spray in your shop you know that you have a hall-mark of guarantee.

Nothing is perfect in this world, not even a perfume spray—

BUT

if the spray has a "B.G." Seal on it, you have the satisfaction of knowing that any imperfection will be rectified by

REPAIR OR REPLACEMENT FREE OF CHARGE.

The "B.G." Seal on a spray is a reminder that it comes from a house wide-awake to every new development in the Perfume Spray trade. This implies the almost continuous designing of new models by skilled artists and executed by expert craftsmen, so that we always have "something new" to offer the trade.

The latest development is the spray of small capacity—one that can be filled with perfume at a reasonable price. Our new **24/-** and **27/-** Series of "MIDGET" Sprays fulfil this requirement.

ILLUSTRATED LISTS WILL BE SENT ON APPLICATION.

BRIDGEN & GRIFFIN 25 BARTLETT'S BUILDINGS HOLBORN CIRCUS ——— E.C.4

SUMMER RETURNS

Be in readiness for the increased turnover you may expect for PIVER'S Summer Fragrances.

An extensive advertising campaign during July, August and September reminds old and informs new Customers of the charm and refreshing qualities of these, *the highest-grade* 2/6 *Floral Perfumes ever offered.*

ESTIMATE YOUR SUMMER RETURNS ON THESE FIGURES:

WHOLESALE, 20/- doz.; RETAIL, 2/6.

Showing a 50 % profit for a quick and easy selling line taking up little floorspace.

SUMMER FRAGRANCES

are persuasively presented in artistic cut-glass bottles.

MINOA	LILALBA	SWEET PEA
CYCLAMEN NEIGE	VIOLETTE REGIS	JASMIN FLAVA
MIMOSA ILEX	MUGUET MAYALIS (Lily of the Valley)	
ROSE SOLEIL	OEILLET FRANGÉ (Carnation)	

Parfumerie L. T. PIVER Paris

London Depot:
102, DEAN STREET, OXFORD STREET, W.1.
'Phone: Regent 5260.

Depot for Irish Free State:
WILCOX, JOZEAU & Co., 19, Temple Bar, Dublin.

DO YOU KNOW

THAT 99% of your customers could use **Armand Cold Cream Powder** with advantage to their skin and advantage to your profits?

The Secret of Success with Armand depends upon the way in which it is applied. Tell your customers to apply **Armand Cold Cream Powder** with a firm puff (sell them a velour or lambswool puff). Tell them to RUB it on and then smooth it out with the finger tips, and so bring out the natural beauty of the complexion. That is all—the customer will be satisfied, and become a regular user.

Send for Price List and particulars of how Armand Direct Advertising will help you

Florian & Armand, Limited

QUEENSWAY, PONDERS END, MIDDLESEX

CELLOPHANE

The ideal **transparent** wrapping **absolutely** harmless, air and grease proof, as used by all the leading Perfumers, Soap Manufacturers, etc., etc., for wrapping Soap, Drugs, Tablets, Bath Crystals, Perfumery, Surgical Dressings, Sponges, Puffs, Soothers, Tooth Brushes and all Articles of Toilet.

Cellophane can be had in sheets, all sizes and colours; also in the shape of **Bags, Discs, Envelopes,** printed or not, allowing the contents to be seen by transparency.

Cellophane wrapped goods **look better—keep better—sell better.**

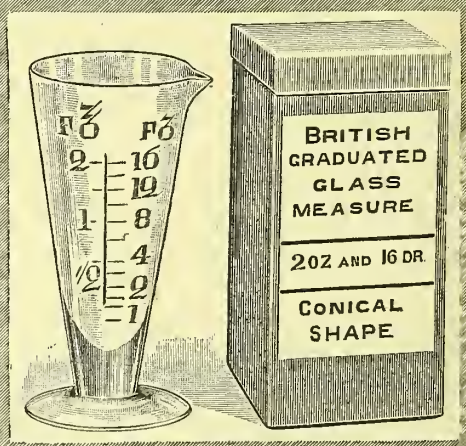
Cellophane **protects, beautifies** and adds the quality touch.

Prices, Samples and Particulars from

The CELLOPHANE COMPANY
7, 8 and 9 Bird Street, LONDON, W.1

Also 305-7 PRODUCE EXCHANGE, MANCHESTER.
35 MILLER STREET, GLASGOW.

TAYLOR'S



MEASURES

OVER 50 YEARS REPUTATION
F. H. TAYLOR & SONS LTD
131 SEVEN SISTERS ROAD, LONDON, N.7
(WHOLESALE ONLY)

THIS NEW *British Complexion Soap* WILL ADD TO YOUR PROFITS

A CHEMISTS' LINE.

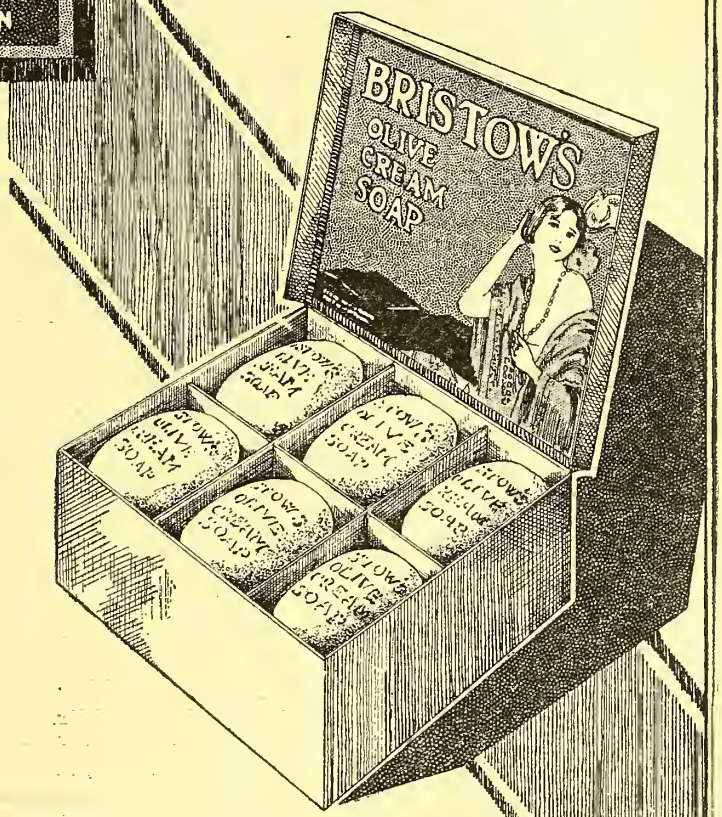
OUR many customers should lose no time in writing for sample Tablet of our newest Toilet Soap—Bristow's Olive Cream.

It is in every way equal to highly advertised lines which cannot compete with it on price—will be sold only through the Trade—and carries liberal Trade Profits.

Be early in the field with what will undoubtedly be one of the most popular lines we have ever introduced.

Retail Price 3½d. per Tablet.

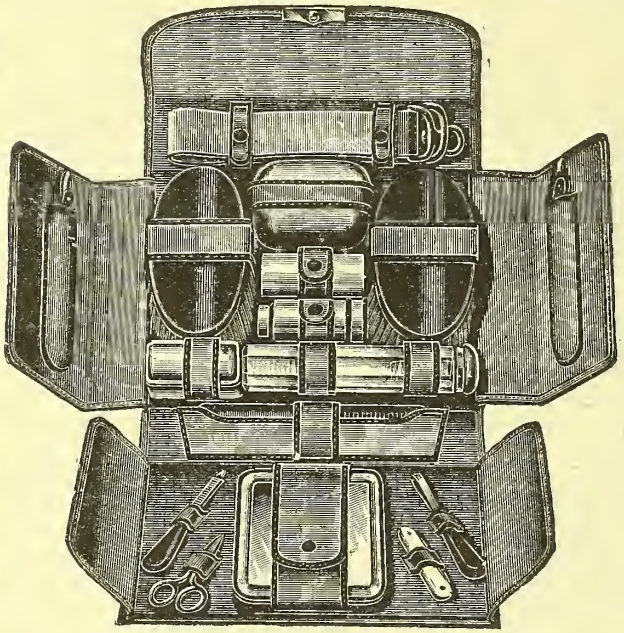
Attractive Showcards free on request.



T. F. BRISTOW & Co. LTD.

Colindale, Hendon N.W.9.

EVERYTHING FOR YOUR FANCY GOODS DEPT.



DRESSING CASES
TRAVELLING CASES
TOILET SETS
and great selection of
TOILET NOVELTIES
FOR
SUMMER SEASON
AT

ADOLPH SCOTT, Ltd.
23, 24, 25 & 26 GT. HAMPTON ST.
BIRMINGHAM

Telegrams: "ADOLPH, B'HAM." Telephone: NORTHERN 2102

SEND TRADE CARD FOR ILLUSTRATED CATALOGUES.

Wholesale only supplied

Green Tubes. Nickel Caps. ½ doz. and 1 doz. Show Boxes.

"FLOROGEN" REGD.
FROZEN COLOGNE AND LAVENDER
(THE NON-EVAPORATING BRAND)

'FLOROGEN"
SOLIDIFIED GLYCERINE AND ROSE WATER
(THE FIRST AND ORIGINAL BRAND)

Ask your Wholesaler for these Goods

Good Sellers and Prices are Right. Suitable for Export.

APPLY DIRECT TO US FOR SHOW MATERIAL & SAMPLES

EXPORT ENQUIRIES INVITED

THE FLOROGEN CO. LTD.
Manufacturing Perfumers
47 Meadow Road - London, S.W.8

Wholesale only supplied

White Metal Tubes. ½ doz. and 1 doz. Show Boxes.

SAME PACKING
SOLID GLYCERINE AND ROSE WATER

Health Salts

IN DECORATED TINS
4/3 doz. 45/- gross

SALINES, LEMONADE CRYSTALS, CITRATE OF MAGNESIA, &c., &c.

Packed Goods

FOR "OWN NAME" TRADE.
FOOT POWDERS, VIOLET POWDERS, EMBROCATIONS, BATH SALTS.

Lorimer-Marshall Ltd.

12 TOWER HILL, LONDON, E.C.3.

PEDICULOSIS

SACKER'S HYGIENIC COMB

THE GREATEST NIT REMOVER EVER INVENTED
as supplied to the L.C.C. Clinics.

Highly recommended by the Ministry of Health and very highly commended by all the leading members of the school medical service in the U.K. and abroad. Price 2/9 and 5/6 each. Wholesale 24/- and 48/- per dozen. Each comb neatly packed in a metal box with directions.

"SANNAKLEEN"

(*Regd.*)

Silver Plated Fine Tooth Comb is the latest and most up-to-date comb

for the Nursery or Toilet Table. Superior to all other combs on the market, without doubt, a boon and necessity in every home.

RETAILS at **2/6** each.

Wholesale 20/- doz. Each comb in an envelope. ½-dozen combs in a box.

Manufactured by :—

SACKER'S HYGIENIC COMB CO.
13 BLACKSTOCK ROAD, LONDON, N.4

OBTAINABLE FROM ALL WHOLESALERS.

OVERALLS

for

Chemists & Druggists

Jackets and Coats of very superior quality, made from the most reliable materials, smartly cut and thoroughly well finished in every detail.

WHITE DRILL JACKETS	*6/11, 8/11, 10/6*
KHAKI DRILL COATS	*7/11, 10/6, 12/6, 14/11*
WHITE DRILL COATS	*10/6*
BLACK DRILL COATS	*16/6*
UNBLEACHED COATS	*8/11*

STOCK SIZES 34 *to* 44 *chest ; measure over waistcoat. Special pockets and little adjustments can be made without extra charge. POSTAGE on single coat 9d., but 20/- orders upwards carriage paid. SPECIAL PRICES FOR LARGE QUANTITIES.*

GARDINER

& CO. (*The Scotch House*), **LTD.**

1, 3, 5 COMMERCIAL RD., LONDON, E.1.

Telephone : Avenue 6650 *Established 1839.*

BRANCHES :
Deptford, Edgware Road, Woolwich, Clapham Junction and Knightsbridge.

Pile up Big Profits with Sorbo Sponges

SORBO Sponges are a line from which you may count with certainty on a good and steady protected profit all round the calendar. They are so well-known and so superior to the ordinary rubber-sponge as to be a continual advertisement for the chemist who sells them. Every Sorbo Sponge is separately wrapped in a hygienic cellophane bag.

Order now from your Wholesaler or direct from us. Price list and trade terms on application.

Sorbo Sponge

THE MOST ABSORBENT RUBBER SPONGE

Retail prices from **1/3 to 10/6** each.

Some other quick-selling Sorbo Lines

Floating Bath Toys, Bath Mats, Complexion Gloves, Bath Straps, Insoles, Heel Elevators, Massage Pads, etc.

Write for particulars.

SORBO RUBBER-SPONGE PRODUCTS, LTD.
Sorbo Works, Woking, Surrey.
Telegrams: "Sorbo, Woking." *Telephone: Woking* 966. (2 lines)

DEARBORN (1923) LTD.

37 Gray's Inn Road, London, W.C.1

Toilet Specialties.

	Price per doz. to Retailer	Selling Price P.A.T.A.
PILENTA SOAP .. .. A complexion soap.	10/-	1/-
PROLACTUM .. .. For the lips.	10/-	1/-
PARSIDIUM JELLY .. For wrinkles.	10/-	1/-
ALLACITE OF ORANGE BLOSSOM .. .. .. A dressing cream.	22/6	2/6
BORANIUM .. .. .. A hair tonic.	22/6	2/6
CLEMINITE .. .. .. For a face lotion.	22/6	2/6
COLLIANDUM .. .. For a face tint.	22/6	2/6
PERGOL .. .. .. A deodorant.	22/6	2/6
TEKKO PASTE .. .. Camphor cream.	22/6	2/6
STALLAX .. .. .. For a shampoo.	13/6 22/6	1/6 2/6
JETTALINE .. .. .. For clearing the skin.	31/6	3/6
PHEMINOL .. .. .. A depilatory.	36/-	4/-
MENNALINE .. .. For the eyelashes.	36/-	4/-
MERCOLIZED WAX .. A face cream.	18/- 31/6	2/- 3/6
STYMOL .. .. .. For oily complexions and blackheads.	36/-	4/-
SILMERINE .. .. .. Hair-curling fluid.	22/6	2/6
BARSYDE .. .. .. Dandruff eradicator.	22/6	2/6
TAMMALITE .. .. For grey and faded hair.	22/6	2/6
LIQUID PERGOL .. .. To check excessive perspiration locally.	31/6	3/6
BICROLIUM .. .. .. For whitening the hands.	22/6	2/6
COCONOIDS .. .. .. For figure development.	31/6	3/6

The Products of

Messrs. PARKER, BELMONT & CO.

CLYNOL BERRIES .. For obesity.	36/- 58/6	4/- 6/6
SOFT PALERIUM .. .. For wrinkles.	45/-	5/-
LIQUID NAIL POLISH .. Brilliant and lasting.	10/-	1/-

Stocked by ALL Wholesale Houses.

COLONIAL DEPÔTS AND AGENCIES.

Australia: ALL WHOLESALERS, & DEARBORN (Australia), Ltd., Grace House, Clarence Street, Sydney.
South Africa: LENNON, Ltd., Cape Town, etc.
SIVE BROS. & KARNOVSKY, Johannesburg.
India: FRAMJEE & SON, Bombay.
A. L. CHOUDRY, Calcutta.
New Zealand: SHARLAND & CO., Auckland and Wellington.
South America: DEARBORN (South America) Ltd., Calle Pavon 2100, Buenos Aires.
Straits Settlements & Federated Malay States: MEDICAL HALL, Ltd., Singapore.

SASSO
OLIVE OIL

THE HIGHEST RECOMMENDATION

Messrs. Sasso sold during the last 12 months 27,000 tons of OLIVE OIL

Producers:—

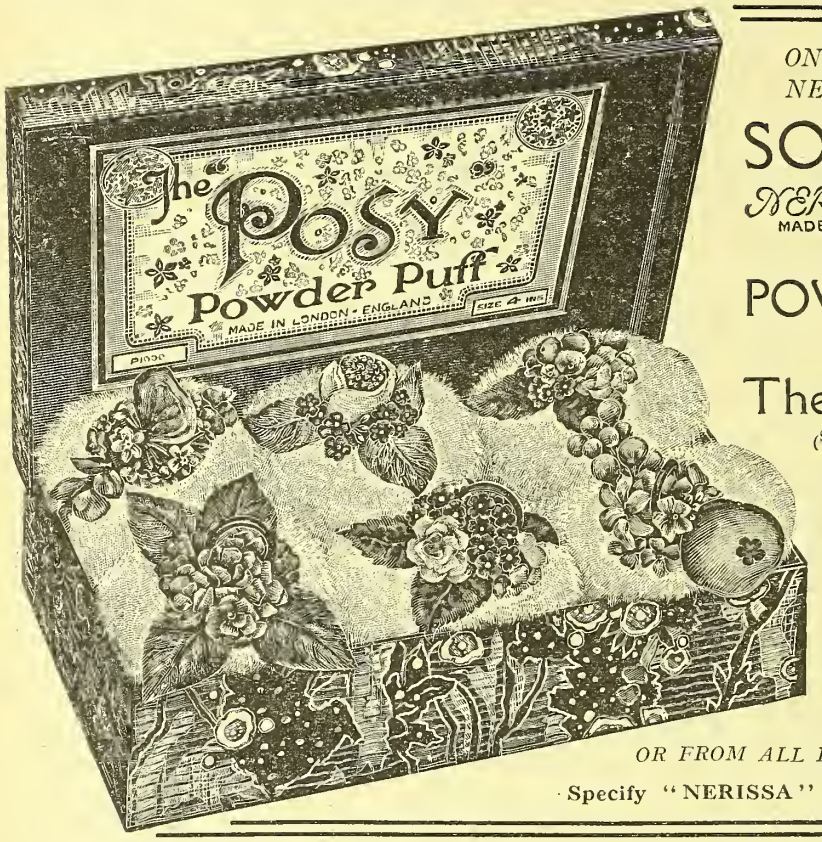
P. SASSO e FIGLI

ONEGLIA——————ITALY

Sole Agents in the United Kingdom

FREDK. BOEHM LIMITED

17 Jewry Street, LONDON, E.C.3



ONE OF THE MANY NEW ADDITIONS TO

SOLPORTS'

NERISSA Regd. MADE IN ENGLAND SERIES

OF

POWDER PUFFS

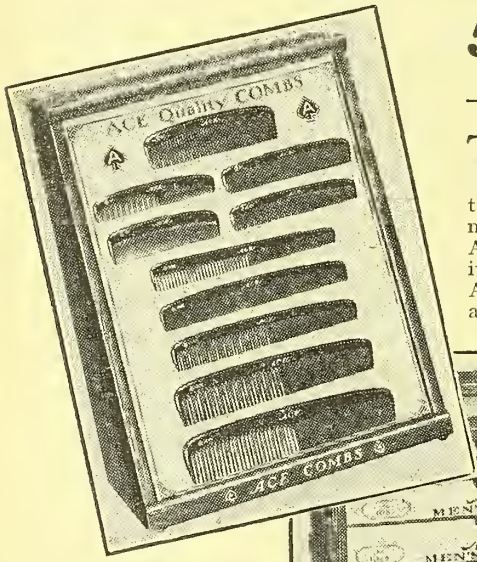
The "Posy" Puff

(SIX IN A SHOW BOX)

No.	Size	Retail Price Each	Trade Price Dozen
P.1000	3½-in.	2/–	16/–
,,	4-in.	2/6	20/–
,,	4½-in.	3/–	24/–

ORDER DIRECT OR FROM ALL LEADING WHOLESALERS.

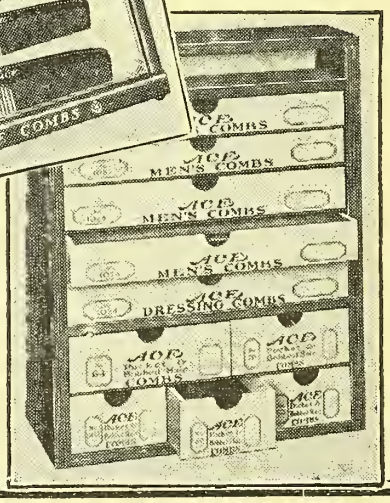
Specify "NERISSA" Brand.



5 minutes or 30 seconds

—how long do YOU take to sell a comb?

TIME is money; anything, therefore, which makes for quick, easy sales will appeal to the live dealer. The tremendous demand for this new Ace Comb Cabinet proves that it is a very real sales aid. Although only on the market a very short time, it has been universally welcomed as the most successful and rapid method of selling combs ever devised. It is enabling Chemists, Hairdressers and Toilet Houses throughout the country to supply the demand easily and quickly. Speed up your Comb sales with the Ace Comb Cabinet.



What it is

Each individual, strong, indestructible, well made and finished comb is protected by a stout, transparent envelope, and as will be seen from the illustration the handy arrangement of the stock facilitates rapid selling. Net price of Cabinet containing 10 doz. Combs **£5.5s.**

HARD RUBBER ACE **COMBS**

THE ACE COMB CABINET contains 1 dozen combs each.

Code No.	Description	Retailing at	Total s.	d.
288	Men's Combs	1/3	15	0
1085	,, ,, ...	1/4	16	0
1028	,, ,, ...	1/6	18	0
1074	Dressing Combs	1/4	16	0
1024	,, ...	1/6	18	0
50	Bobbed Hair Combs	1/-	12	0
63	,, ,, ,, ...	1/3	15	0
64	,, ,, ,, ...	1/8	£1 0	0
70	,, ,, ,, ...	1/-	12	0
3158	,, ,, ,, ...	1/3	15	0
	Total Retail Price		£7 17	0

AMERICAN HARD RUBBER CO.
(BRITAIN), LTD.,
13a FORE STREET, LONDON, E.C.2.
Sole Distributors—**PENNEY & CO., LTD.**
16,18 BEAK STREET, REGENT STREET, W.1.

G. A. 5532

PROTECTED PRICES

CHATELAIN'S REMEDIES

Are now on the P.A.T.A.

URODONAL JUBOL GLOBEOL PAGEOL

etc., etc.

HEPPELLS Ltd. are the SOLE CONCESSIONNAIRES for all these products. Consequently the importation from abroad by other firms of these specialties, or their distribution in packages not bearing the label of HEPPELLS Ltd., constitute an infringement of the rights of the Company.

It is the intention of

HEPPELLS Ltd.

in the interests of all concerned, to proceed against any persons or firms who infringe their rights as Sole Concessionnaires, and have placed all Chatelain's preparations on the P.A.T.A. and are determined to help the retail chemists in every way to promote sales.

HEPPELLS Ltd.

164 PICCADILLY, LONDON, W.1

Collapsible Tubes

Betts' make the Best

METALLIC CAPSULES,
COLLAPSIBLE TUBES,
SPRINKLER CORKS,
TIN FOIL
or LEAD FOIL.

Betts & Co Ltd
1. Wharf Rd., City Rd.
London. N.1.
Established 1857.

Seed Dressings

TOMLINSON & HAYWARD
LIMITED
51 NEWLAND, LINCOLN

This is the *Original* firm, established in 1842, who have for many years past supplied SEED DRESSINGS, Sulphate of Copper, etc. Agents' own formulas receive special attention, the recipe being faithfully followed. Quotations and samples promptly sent.

WILL OLD AND NEW CUSTOMERS PLEASE ADDRESS AS ABOVE? WE HAVE NO CONNECTION WITH ANY OTHER FIRM.

WAGNER'S DRY BOTTLE CAPS
BEST IN QUALITY & APPEARANCE

Self-Fixing
R.V. WAGNER
33, Brooke St., London, E.C.1.
Tel. No: Holborn 5090

To Overseas Traders

We have a special Drug Department and expert Buyers for all kinds of Drugs, Chemicals, Hospital requisites, Photographic, Optical and Dental Goods.

Indents promptly and carefully executed for all parts of the world if accompanied by Bankers' Credit.

Original Invoices supplied. *All discounts allowed.*
Moderate Buying Commission. *Enquiries Invited.*

FOWLIE & BODEN, LTD. (John Murdoch Department)
29/35 CITY ROAD - - LONDON, E.C.1

Ambassadors

—friendly, of course, and with the best credentials have cemented many friendships, sealed many bargains. The catalogues, circulars and letters we may send you can only convey a little of the spirit of our goodwill and interest in your business.

Our representatives will always be pleased to confer with you upon any question of quality, price, or service.

TRADE MARK

SANGERS
258 Euston Road
LONDON, N.W.1, and at
Old Infirmary Buildings
NEWCASTLE-ON-TYNE

Telegrams :
"Pharsalia, Phone, London."
Telephone :
Museum 5440 (Private Exchange)

Toilet Soaps of Quality—

6 ounce Bath—**Round**—white or coloured, assorted perfumes, elegant pack - - - - **66/-** gross.

Oblong—white or coloured, assorted perfumes, strawboard pack - - - **54/-** gross.

$2\frac{1}{2}$% discount. — Carriage Paid. — Free Cases.

A sample with pleasure.

R. F. WHITE & CO., Ltd.
Victoria Station House,
LONDON - - S.W.1.

The British and Gold Medal Hair Dressing is in greater demand

ANZORA

Anzora is more popular than ever, and almost every man demands it. Order a supply at once and reap your share of the liberal profits. Anzora Cream for greasy scalps and Anzora Viola for dry scalps. Obtainable from wholesalers. Terms : **12/-** doz., retail at **18/-** doz. **20/-** doz., retail at **30/-**

A SUPPLY OF ATTRACTIVE SHOWCARDS and cutouts sent POST FREE.

If unable to obtain from your wholesaler write to Anzora Perfumery Co., Ltd., Willesden Lane, London, N.W.6.

THE ORIGINAL :: :: AND :: :: STILL THE BEST

JACKEL'S CREAM
WITHOUT GREASE
FOR THE HAIR

SOLD EVERYWHERE.

1/9 PER BOTTLE **2/6**

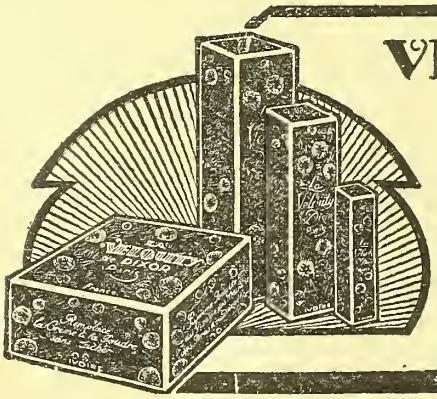
Jackel's Cream has now been over 40 years on the market and enjoys a steady reliable sale. Once a customer buys Jackel's, imitations have no appeal because Jackel's is still the best.

HOW ARE YOUR STOCKS AT PRESENT?

12/- and 18/- per dozen.
Retailing at 1/9 & 2/6 per bot.

SHOWCARDS AND PARTICULARS FROM YOUR WHOLESALE HOUSE.

JACKEL et CIE (of Paris) Ld.
GLASGOW.



VELOUTY de DIXOR PARIS

COMBINED CREAM AND POWDER

The advertised line that you are asked for

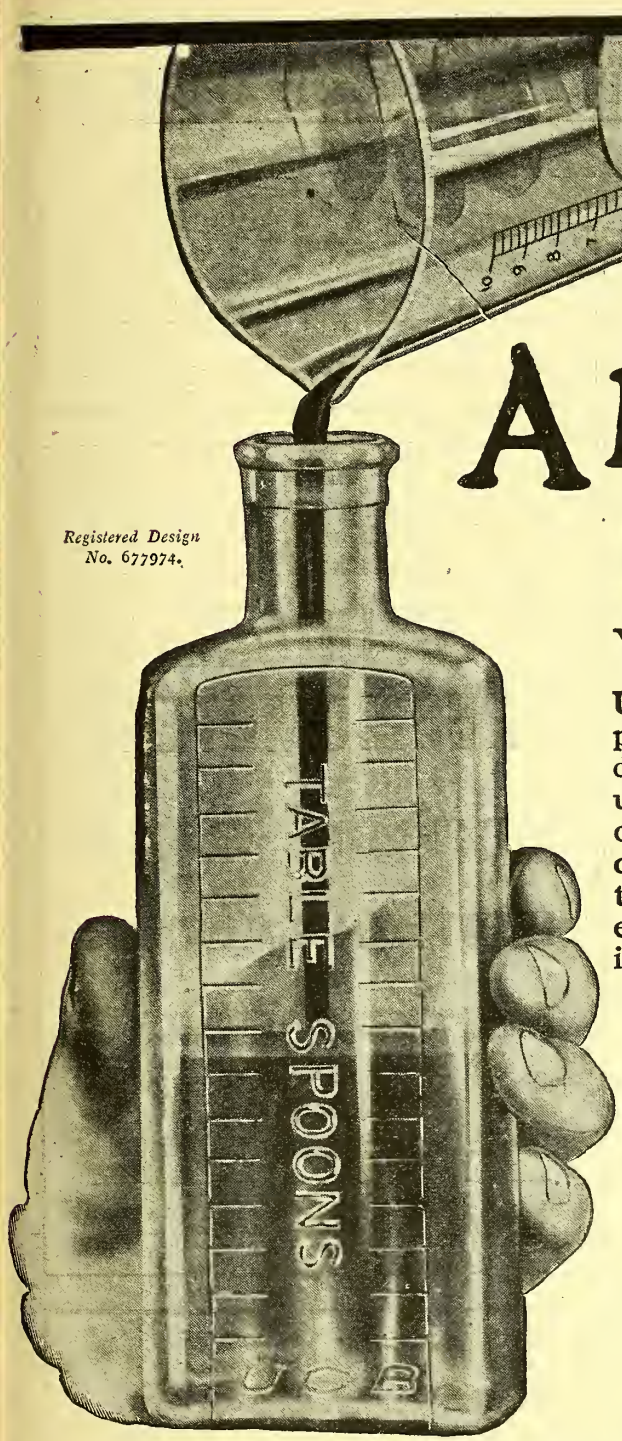
DAINTY PRESENTATION

Samples free upon receipt of tradecard or billhead

Prices :—Full size pot	**21/-** doz.	Retail	**2/9**
Super Tube	**22/-** „	„	**3/-**
Large „	**14/-** „	„	**2/-**
Handbag „	**3/-** „	„	**6d.**

Made in three shades : WHITE. IVORY and NATURAL

Obtainable from your regular Wholesaler or direct from the Sole British Agents :
DEBACQ & HARROP, 68 Newman Street, Oxford Street, LONDON, W.1



Registered Design No. 677974.

A Measure of Security

YOUR reputation is too valuable to be trusted to indifferent bottles. The U. G. B. Medical bottle is perfect in every point that is of interest to chemists and dispensers. Its white crystal clarity is unequalled. Its even corkage is a great convenience; its accurate markings make quantities certain; while the strength in the rounded shoulders, reinforced lip, and elaborate annealing process by which it is strengthened, give security unequalled by any other bottle in the world.

British throughout and made only by the United Glass Bottle Manufacturers, Ltd. Supplied through your wholesaler.

SIX POINTS of Perfection.

1. *Even Corkage.*
2. *Reinforced Lip.*
3. *Rounded Shoulders.*
4. *Accurate Capacity.*
5. *Rounded Corners.*
6. *Accurate Graduations.*

UNITED GLASS BOTTLE MANUFACTURERS · LIMITED

The biggest manufacturers of glass bottles in Europe.

Head Offices:

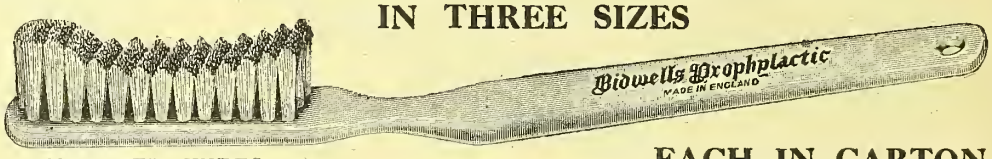
40/43 NORFOLK STREET, STRAND, LONDON, W.C.2.

Telephone: Central **8080** (10 *lines*). *Telegrams: "Unglaboman, Estrand, London."*

PP **Works: Charlton, London; Castleford, Yorks; Hunslet, Leeds; St. Helens, Lancs; Seaham Harbour, Durham.** *No. 73*

BIDWELLS' PROPHYLACTIC TOOTH BRUSHES

IN THREE SIZES



SILVERED WIRES.

EACH IN CARTON.

CASTLE MILLS, AXMINSTER. On 6 dozen lots own name free on Carton, if desired.

BOXES

"Gofco" boxes are *the* quality boxes for quality goods. Their attractiveness sells the goods before the lid is off. They are specially made to individual requirements at the best price in the quickest time, Special quotations for Fancy, Display, Printed. Slide, Stitched, Socket and Division boxes.

J. GOFF & COMPANY
Mountford Works
Francis Street
BIRMINGHAM

VISKAP BOTTLE CAPS

The ORIGINAL-BEST and ONLY BRITISH MADE.

SELF-FIXING, HERMETIC,
TRANSPARENT, OPAQUE, COLOURED.

IMMEDIATE DELIVERY
FROM THE MANUFACTURERS.

VISCOSE DEV. Co LTD. BROMLEY KENT.

Zeal's CLINICAL THERMOMETERS

are

BRITISH MADE

by

BRITISH LABOUR

from

BRITISH GLASS

and

GUARANTEED
PERMANENTLY ACCURATE

G. H. ZEAL, LTD. 75 & 77 St. John Street —LONDON, E.C.1—

Glass Bottles

of every description for Chemists.

DISPENSING BOTTLES, POISONS, VIALS, PANELS, GRADUATED MEASURES, &c.

ENQUIRIES INVITED FOR ANY SHAPE BOTTLE.

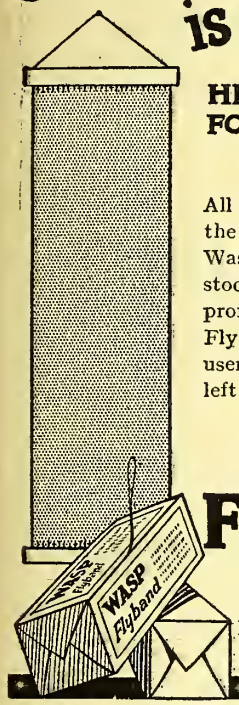
BUY FROM ACTUAL BRITISH MANUFACTURERS:

FREDERICK HAMPSON Perseverance Glass Works, Duncan Street, Salford

ESTABLISHED 75 YEARS.

Telephone: 1018 *Trafford Park.* *Telegrams:* "*Attention, Salford.*"

Catch that Fly is the daily cry



HENCE THE DEMAND FOR THIS FAMOUS FLY TRAP!

All through the Summer months the demand continues for the Wasp Fly Band. Carry a full stock and benefit by rapid and profitable sales. The most effective Fly Catcher made. Satisfies all users. Keeps its condition. Stock left over sells next year, if it is

WASP FLYBAND

Write to the Sole Manufacturers for prices and particulars:—

F.W. HAMPSHIRE & CO., Ltd.
Riverside Works, Derby.

DEVONSHIRE
FRUIT PASTILLES

Each of the eight exquisitely flavoured varieties is made with the actual fruit extract.

A profitable and essentially pharmaceutical side line.

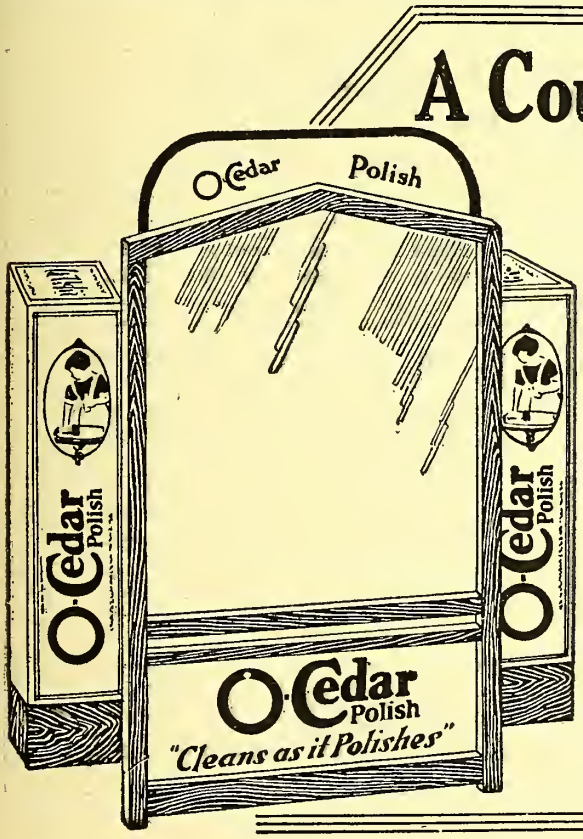
Beautifully printed cartons, 10-colour window centre piece and 4lb. show jar FREE with 28lbs. at **1/3** per lb.

Sells **2d.** per oz.
7½d. per 4 ozs.

You cannot appreciate them without a sample. Yours is ready.

ERNEST JACKSON & Co., Ltd.
London Office:
Plantain Place, Crosby Row, Borough, London, S.E.1.
'Phone Hop. 2668.
Works: Crediton, Devon.

A Counter Attraction—
Quite Free, Too!



AN ORDER for O-Cedar goods to the value of £1 net brings this striking counter stand to you, free. Its handsome appearance will bring added attractiveness to your counter displays, and help you to sell still more goods. Send your order NOW!

Orders under £5 net, carriage forward. Orders £5 or over, carriage paid. When sending order to O-Cedar, Limited, please indicate name of Factor through whom order is to be filled.

O-CEDAR, LTD., SLOUGH, BUCKS

PURE RUSSIAN

LIQUID PARAFFIN MEDICINAL B.P.

ALL GRAVITIES. HIGHEST VISCOSITY.

PURE RUSSIAN

"JASMINE" BRAND WHITE OILS

CHEMICALLY PURE. WATER WHITE. ODOURLESS.
FOR MANUFACTURING PURPOSES.

Competitive Prices. *Best Quality.* *Immediate Delivery.*

THE PURE RUSSIAN LIQUID PARAFFIN CO., LTD.
3 ST. HELEN'S PLACE, LONDON, E.C.3

Telephone: AVENUE 7698. Telegrams: "INVATORE, STOCK."

LIQUID PARAFFIN

Sterns B.P.
is guaranteed to be the finest quality of Liquid Paraffin produced. It has the patronage of the largest wholesalers, the recommendation of the Medical profession, and is used in the principal Hospitals in preference to all other kinds.
STERNS
LTD.,
80 Royal London House,
Finsbury Square,
E.C. 2.

ADEPS LANÆ B.P.
Anhydrous *Hydrous.*
An all-British product, from the finest Yorkshire Wool Fat, extra pale, and entirely odourless.
Enquiries solicited for any quantity, any package.

LANOLINE COLD CREAM
A Novelty. This cream is non-greasy, fragrant, and contains a very high percentage of Lanoline. Invaluable for the skin. In Pots and Tubes.

CRODA LTD.
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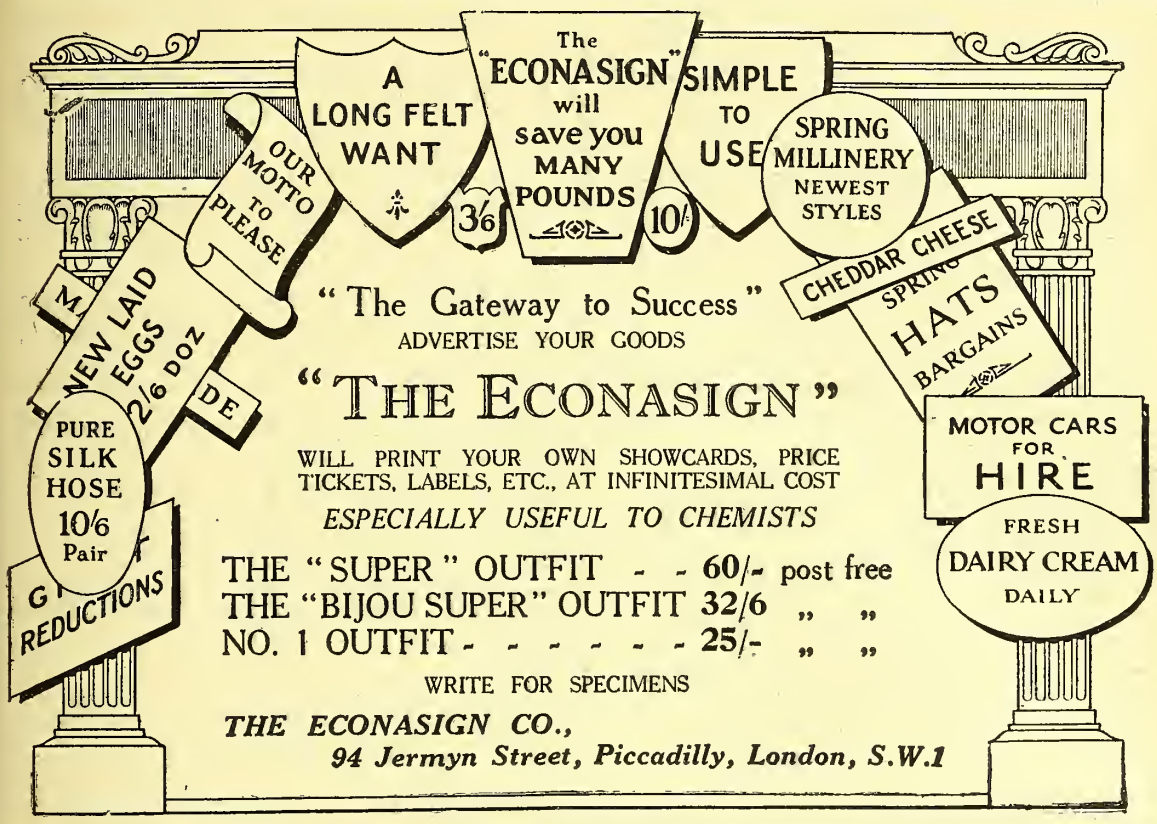

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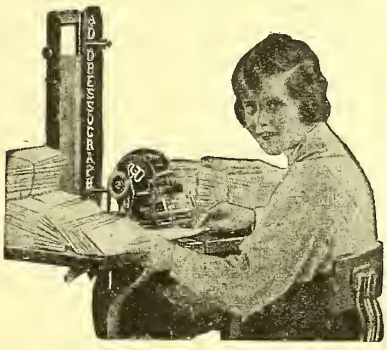

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The 'FLY CEMETERY,' in Sheets
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The 'CEMETERY' FLY BAND, 3 in. wide
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Prices on Application.

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CONTROL YOUR SHOP
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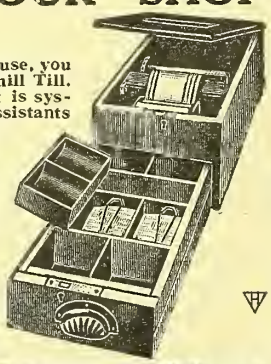
When away on Holiday or other cause, you can control your shop by a Gledhill Till. Every penny received or paid out is systematically accounted for; your assistants are protected; there is no chance of leakage or errors; and your profits are safeguarded.

The Gledhill Till is British throughout; costs a trifle more than the "cheap" till, but lasts ten times longer. The service it gives is priceless.

Send for particulars, instalment plan and money back offer.



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FIXED PRICES
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Extensively advertised on National lines.

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A safe, simple and reliable remedy for Children's Ailments is advertised so extensively in the daily and weekly Press as to bring mothers to the retailer without effort on his part.

The selling has been done before the mother reaches the chemist, and, having supplied her, it is only common sense to claim she will buy other family necessaries from him. Moreover, the continuous demand for it produces a quick turnover.

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OSCAR SCRUTON & CO., YORK

COOK'S "ASEPSO" 3% Biniodide of MERCURY

Established over a Century.

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The Genuine Antiseptic TOILET SOAP

Invaluable to the Medical and Nursing Professions.
FOR ECZEMA, RINGWORM, PRICKLY HEAT, and MOST SKIN TROUBLES.
Sample tablet sent gratis on application.

EDWARD COOK & CO. LTD. The Soap Specialists, LONDON, E.3.
Also makers of "Asepso" Shaving Soap.
Obtainable through all Chemists.

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The unfailing preventative of seasickness and all other forms of travel sickness.

Retail 3/- each.

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THE BEST AND SAFEST INFANTS' MEDICINE OF OVER 120 YEARS' STANDING.

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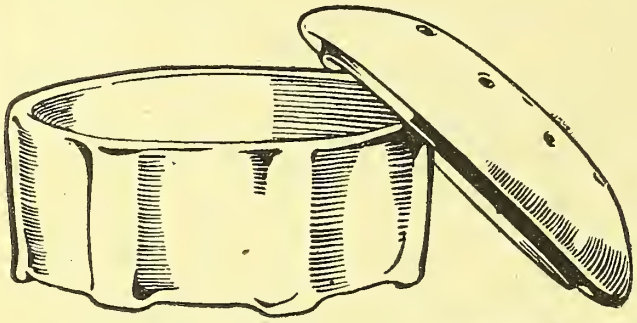

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THE "CLINBRITIC" DENTURE DISH

CLEAN . . . INCONSPICUOUS . . . VENTILATED

Artificial Teeth, when not in use, are best kept in water or antiseptic solution. So far a simple container has not been available. The "CLINBRITIC" DENTURE DISH supplies an obvious want and sells readily at sight.

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VARICOSAN BANDAGE

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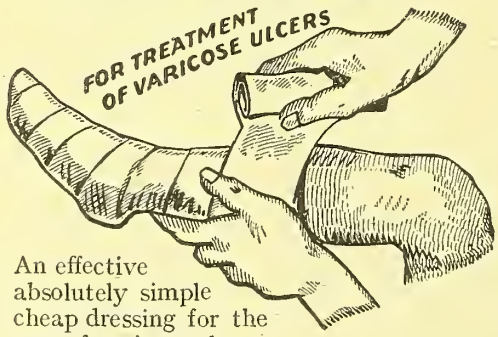

An effective absolutely simple cheap dressing for the *cure* of varicose ulcers.

USED BY THOUSANDS OF PHYSICIANS WITH SUCCESS ALL OVER THE WORLD.

ASK FOR PARTICULARS TO YOUR WHOLESALE HOUSE.

Sole Concessionaire (Great Britain and the Colonies, U.S.A., China and Japan):

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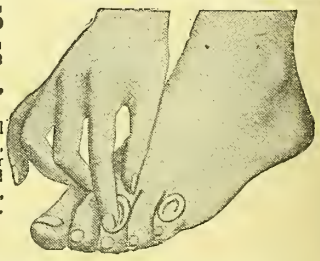
Dr. SCHOLL'S ZINO PADS

For Corns, Bunions, and Callouses.



Being simple to apply, effectual in use and heavily advertised, they have secured the major part of the enormous and increasing demand for corn, bunion and callous remedies.

Put one on—the pain is gone.

Dr. Scholl's Zino Pads remove the cause, prevent all chafing and rubbing, are self adhesive—require no strapping, are applied in three seconds and do not come off even when bathing. Retail price per box **1/3.**

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Are known the World over as the Largest Manufacturers of

BEST BRITISH BRUSHES

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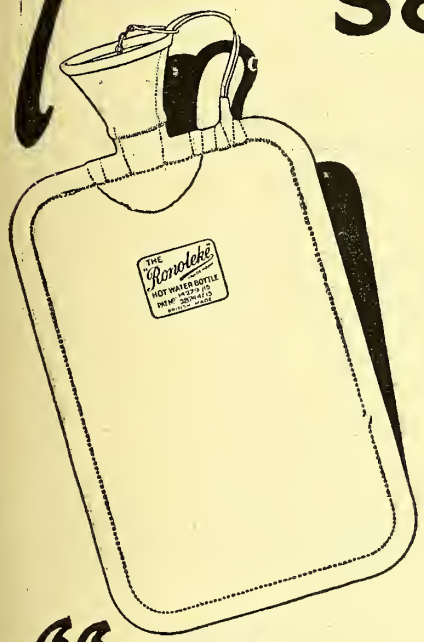
How to double *Your* Hot Water Bottle sales this year



THERE is going to be an enormously increased demand for the famous RONOLEKE Hot Water Bottle during the coming season. Commencing in September, we are inaugurating a very widespread and vigorous advertising campaign in the daily and weekly press for RONOLEKE. Many thousands of people will want to buy RONOLEKE Hot Water Bottles. Are *you* ready to get your share of this great new business?

"Ronoleke" HOT WATER BOTTLES

should be the quickest selling line in your business. We are going to sell a RONOLEKE for every bed, and the amount of your sales depends only on the active co-operation you give us in selling and recommending RONOLEKE.

Don't delay—go "all out" for RONOLEKE Hot Water Bottles. Get them from your wholesaler to-day.

Manufactured by CAMPBELL ACHNACH & CO. Ltd., Wallace Street, Glasgow.

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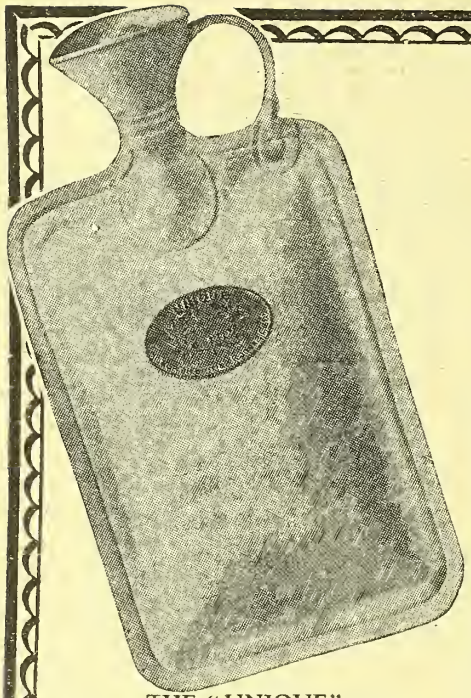

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with patent filler and rubber-covered stopper to prevent burning. Reinforced with fabric. Used in all parts of the world—in the Tropics and in Arctic regions.
Reserved for Chemists only

"Not only British—but North British"

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RUBBER HOT WATER BOTTLES

will be convincingly advertised to the Public

North British Bottle sales have always been good and steady, and the coming season's advertising is designed to stimulate and renew demand to a still greater degree.

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POPULAR.—A good quality bottle offered at a competitive price. Reinforced with fabric.

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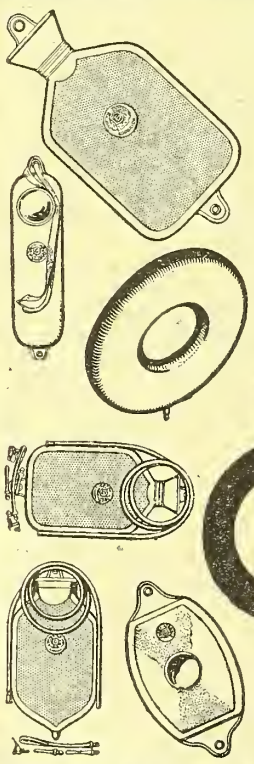

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British Goodrich Druggist Sundries include :—

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Retailers can obtain supplies from their usual Wholesalers.

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The Quick, Efficient Dressing for

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3d. Envelopes - **2/-** doz.
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1/- Boxes - - **7/6** „

2½% Monthly A/c P.A.T.A.

Samples & Showcards free on request.

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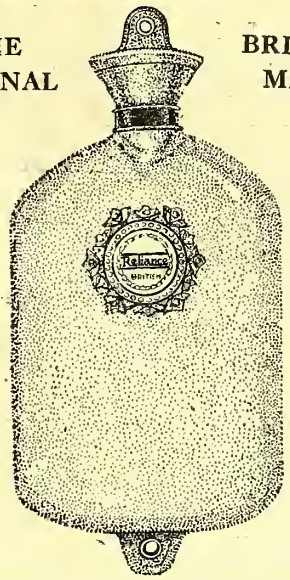
THE ORIGINAL BRITISH MADE



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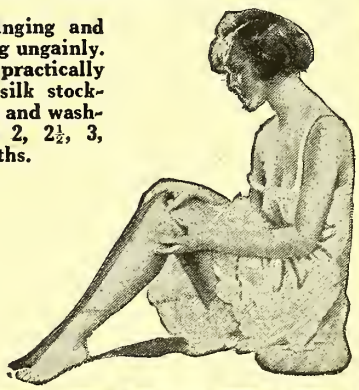

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Recommended by Doctors and Nurses everywhere.

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'SURCO' Seamless Hosiery

FOR QUALITY.

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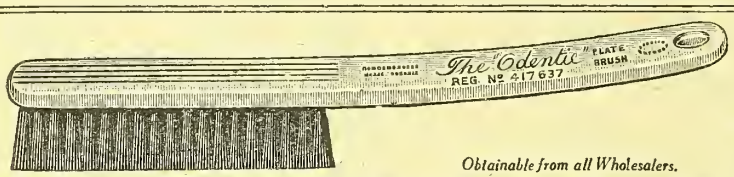

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For ARTIFICIAL DENTURES
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W. R. SPEER & SON (Estd. over 100 years)
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3 row Hard, Medium, Soft, Yellow Hair @ ... ... 16/- per dozen
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Stocked by the Leading Wholesale Houses in convenient packages.
Usual G.P.O. Red or Plain White.

No Loose Tops and Bottoms————————Tight Fitting Lids.

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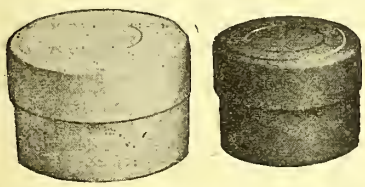
have replaced the old "Willow" boxes—Greaseproof—the bottoms cannot fall out.



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SILVERED WIRE DRAWN.
MADE IN 3 SIZES IN SELECTED WHITE AND UNBLEACHED BRISTLES.
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Non-Poisonous, yet more effective than Cyanide.
Sufficient for 2 6 20 40 nests
7d. 1/4 3/6 6/6
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FEET PLAISTERS POWDERS
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TO EX-SERVICE CHEMISTS ONLY
I have an honest straightforward scheme to offer you. I prefer you if your income is under £400 a year. It should add £200 a year to your income if you've got the necessary vim. There is *no fee*. Write now—
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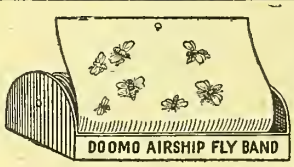

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A wide and long band, sticky on both sides, giving great effective surface. *Write for Quotations.*
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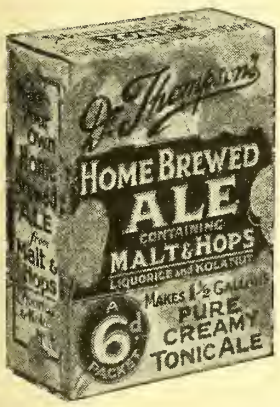

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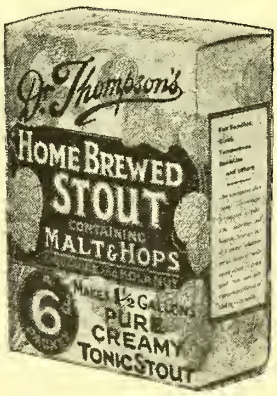

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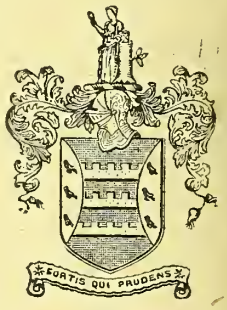

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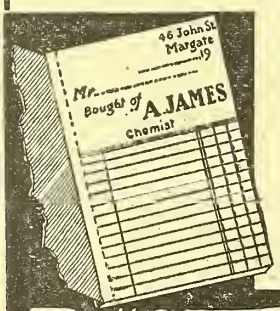

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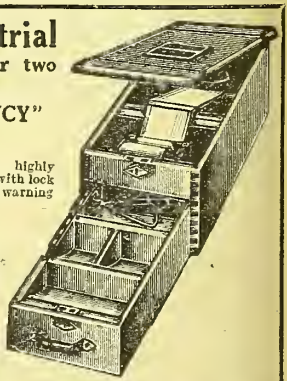

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THE CHEMIST & DRUGGIST

CONFERENCE NUMBER

AUGUST 7, 1926

Published weekly at 42 CANNON ST., LONDON, E.C.4
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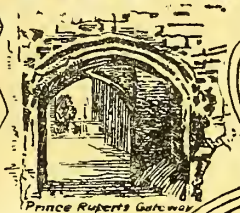
Single copies, 9d. each.



Contents

No. 6 Series 2426 Vol. 105

Business Changes

MRS. E. M. WELLINGS has opened a pharmacy at Moss ad, Winnington, Northwich.

MR. H. HARRISON, chemist and druggist, has acquired e branch shop at Thorne from Mr. R. R. Mindham, ainforth.

T. Ridley & Son, Ltd., chemists, 9 English Street, rlisle, have opened additional premises at 10 Botcher- te, Carlisle.

Mr. J. Hamilton Mortimer, chemist and druggist, 3 High Street, Epsom, has taken over the business cely carried on by Mrs. Tottle, at 58 High Street, psom, and it will in future be known as Tottle's harmacy.

THE old-established business of Mr. Hedley Masson, hemist and druggist, 2 & 4 London Road, Forest Hill, ondon, S.E., has been purchased by Mr. W. T. Robin- n, late of Ealing. Mr. Robinson will take over the usiness on September 1, and so soon as possible will ransfer it to new premises at 34 London Road, where he ill continue to trade under the old name.

LICENSING THE SALE OF PHOTOGRAPHIC GOODS.—The zechoslovak Government is considering the advisability f requiring dealers in photographic goods to pass an xamination test, or even of introducing a licensing ystem, similar to that for pharmacies, for this branch f trade.

CYANIDE MISTAKEN FOR SUGAR.—M. Charles Breton, pharmacist at Lille, before taking a cup of herb tea, ut in it a quantity of what he supposed to be pow- ered sugar. He collapsed almost instantaneously, and as dead when he reached the hospital, where it was ound that he had swallowed potassium cyanide.

English and Welsh News

The Editor will be obliged if subscribers will send him marked copies of newspapers containing items of interest for insertion in this or other news sections.

Committee on Poisons

A notice has been issued by the joint secretaries of the Committee on the Poisons and Pharmacy Acts that the Committee has decided to take evidence on matters within the terms of reference. Any person, association or firm wishing to give evidence or place their views before the Committee should communicate with Mr. M. D. Perrins (joint secretary), Home Office, Whitehall, London, S.W.1. The Committee will inquire generally into the existing machinery regulating the sale (retail and wholesale), keeping, distribution and supply of poisons; any consideration of proposals for the inclusion in or exclusion from the Schedule of Poisons of any specific substance is not held to fall within the Committee's terms of reference.

Petroleum Act, 1926

Under this Act, which is now in force, a new scale of fees for licences for storing petroleum spirit is to be substituted for the present 5s. fee. The conditions of the licence will require to be posted up in the premises, and contraventions will be subject to penalties. The test for petroleum spirit has been made clearer and more complete, but the method of manipulation and the flash point remain the same. Occupiers of licensed premises will be required to notify accidents caused by explosion or fire, involving petroleum spirit, that occur on the premises.

Fees for Stamping Weights and Measures

The Weights and Measures (Verification and Stamping Fees) Order, 1926, which comes into force on October 1, alters the fees hitherto paid for stamping. Among the fees given in the schedule are the following:—

Liquid or Apothecaries' Measures: Not exceeding a pint—when the number of sub-divisions does not exceed six, 4d.; where the number exceeds six, then for each additional six sub-divisions or any number less than six, 1d.

Avoirdupois and Grain Weights: Each weight above 8 oz., and not exceeding 5 lb., 2d.; each weight of ½ dr. and not exceeding 8 oz., 1d.; each grain weight, 2d.

Troy and Apothecaries' Weights: Each weight above 5 oz. and not exceeding 50 oz., 4d.; each weight not exceeding 5 oz., 2d.

Metric Measures: Above 500 c.c. and not exceeding 2 litres—when the number of sub-divisions does not exceed ten, 6d.; when it exceeds ten, then for each additional ten sub-divisions or any number less than ten, 3d.; not exceeding 500 c.c.—when the number of sub-divisions does not exceed ten, 4d.; when the number exceeds ten, then for each additional ten sub-divisions or any number less than ten, 2d.

Metric Weights: Each weight not exceeding 2 kilos, 2d.

Weighing Instruments: Above 14 lb. and not exceeding 56 lb., 1s.; above 1 lb. and not exceeding 14 lb., also not exceeding 1 lb., 6d.

Society of Apothecaries of London

At the assistants' examination, held on July 26, 27, 28 and 29, the following candidates were granted the certifi-

B B

cate of qualification to act as an assistant to an apothecary in compounding and dispensing medicines :—

Adams, G. W.	Laborda, H. F.	Phillips, B. F.
Alexander, K. E.	Lane, I. I.	Picton, M. L.
Barber, D. E.	Laurisch, M.	Powell, F. E..
Chaplow, E.	Law, M. E. J.	Powell, K. M.
Chatburn, M.	McClory, L. M.	Richardson, I. E.
Copsey, A. P.	McGill, D. F.	Robinson, M. W.
Crawford, M.	Mannington, N.	Rose, M.
Eve, P. E.	Marris, L. M.	Stanley, M. E.
Fleming, F.	Marsh, C. E.	Stead, D. S.
Halford, F.	Marshall, M. G.	Sugden, M. L.
Hamman, P.	Mills, L. M.	Sutherland, M. E.
Hartley, G. M.	Mitchell, M. H.	Taberner, E.
Hayes, A. M.	Murray, P.	Walker, E. A.
Jenkin, M. A.	Newcomb, B. M.	Williams, G.
Jones, L. A.	Nicholas, B. A.	
Kirkman, K. G.	Oliver, K. M.	

Poisonings

A verdict of "Suicide whilst in a state of unsound mind" was returned at the inquiry by the Portsmouth City Coroner into the death of Georgeanna Mills, a widow, aged sixty-two, who was found dead on July 26 in her room at an hotel in Landport, with an empty lysol bottle on a chair near her bed.

The Portsmouth City Coroner, on July 30, held an inquest with reference to the death, through strychnine poisoning, of Cecil Summers, aged two years and ten months. The inquiry revealed the fact that the child had taken by misadventure some Easton's syrup tablets, purchased three years ago by the boy's grandmother. Mrs. Summers, the boy's mother, stated that the tablets had been kept upstairs, but she brought them down, intending to throw them away. She was called to the door, however, and left the bottle in a basin on the second shelf of the dresser, where it was forgotten. On the previous Sunday, while she was preparing dinner, the boy came to her with the bottle in his hand and said his mouth and nose hurt. While he was trying to tell her that he had eaten some of the tablets he collapsed, screaming in agony. There were only three tablets left in the bottle, and he must have taken six or eight of them. Herbert Leighton Thorne, branch manager to Boots, Ltd., Elm Grove, Southsea, spoke to the purchase of the tablets by Mrs. Gardner in April 1923. Dr. J. H. C. Green, who was called to the boy, stated that he found him in an acute convulsive condition and drove him to the hospital, where morphine as an antidote was given, but the boy was dead. The coroner said he could see no one to blame. The tablets were purchased quite legally, but, unfortunately, the child probably thought they were sweets. A verdict of "Death from strychnine poisoning, arising from misadventure," was returned.

Birmingham

New Street Picture House is to become an arcade of shops. Will pharmacy occupy one?

Mr. T. W. Lowther, with a coadjutor, was responsible for the publicity and programme work of the Great Gymkhana at Moseley in aid of the Children's Hospital at the Hall.

A very interesting talk on weights and measures was recently given before the Rotary Club by Mr. Allan Granger, the Chief Inspector of Weights and Measures for the City of Birmingham.

Mr. Place, who for many years held the pharmacy which formerly belonged to Mr. Blackwell, Moor Street, recently sold his business to Mr. Southerton, and has purchased one of the new houses on the Brandwood Estate.

Romsley Hill Sanatorium for the Treatment of Tuberculosis, the property of the Birmingham Hospital Saturday Fund, has been taken over by the Birmingham City Council for £31,000. Miss Cooper is the dispenser at the institution.

A boy, aged eleven, dashed into a chemist's shop in John Bright Street, on July 27 and snatched a tube of lip salve, applying it to his lips immediately on getting into the street. At Birmingham Juvenile Court the chemist stated that he would not have prosecuted the boy but for the fact that these pilferings were a daily occurrence. The Bench adjourned the case for twelve weeks, intimating that if there were no further complaint during that time nothing more would be heard about the matter.

Leicester

At Leicester Quarter Sessions, on July 27, Alfred C. Howard and Percy B. Gadsby were each sentenced to twenty-two months' hard labour, the former for embezzling and the latter for receiving (*C. & D.*, July 17, p. 119). The police stated that Gadsby was formerly in the service of Messrs. Wand, and later employed by a firm of chemists in their photographic department, but was dismissed for dishonesty. Since then he had been a bookmaker. Mr. Arthur Davis, in a plea for leniency on behalf of Howard, said that since last November he had gone straight.

Liverpool

Merseyside chemists report that things were very quiet over the holidays.

"Thirsty humanity relieved here. My special saline draught with lime juice syrup 5d. per glass," is the announcement in the window of a well-known city chemist.

Liverpool Civic Week in October is to be made the occasion of a big boost of the city, as a shopping as well as an industrial centre. The City Council have made a grant, and the Lord Mayor has promised his active support.

Sheffield

The chemists' accounts for Insurance dispensing for July amounted to £2,024 1s. 7d.

A store under the name of "A to Z" has been opened in Machon Bank to deal on the C.O.D. system.

The coal strike is causing serious trouble in the supply of bottles; production has been reduced to half, and the price has advanced by 10 per cent.

The offer of a safety razor free for the purchase of a tube of Palm Olive shaving cream has secured window displays by a large number of chemists in the city.

Miscellaneous

POISON-LICENCE APPLICATION.—Mr. John Alexander Crook, seedsman, manure merchant, and agricultural machinist, Chapel Walks, Preston, has applied to the Town Council for a licence to sell sheep dip.

LONDON CHEMISTS' GOLFING SOCIETY.—A meeting was held at the Crews Hill Golf Course on July 22. The captain's prize, presented by W. S. Boyack, was won by Mr. A. Hawkins. The prize presented by Arthur H. Cox & Co., Ltd., was won by Dr. B. Yule.

THEFT OF CAMERAS.—On July 29 the window of the branch of Needhams, Ltd., chemists, at 187 Newington Butts, London, S.E., was smashed and several cameras were stolen. There was a notice in the window inviting passers-by to guess the weight of a stone which thieves had used to smash the same window a few weeks ago.

FIRES.—Early on July 31 the headquarters of Timothy White Co., Ltd., Chandos Street, Portsmouth, were the scene of a fire which called for the services of the entire city fire machines. At one time the offices were in danger, but this was quickly overcome. The small amount of damage done is accounted for by the successful working of an automatic alarm sprinkler.—The previous day a motor-car caught fire in Queen Street, Portsmouth, and a resourceful constable appropriated some syphons of soda water from a passing dray, effectively illustrating a familiar experiment.

IN THE COURTS.—At the Lambeth Police Court last week a charge against William Gates, manager to J. W. Douglas, Ltd., chemists, Newington Butts, of selling lime water 85 per cent. deficient in calcium hydroxide was dismissed on payment of three guineas costs. Mr. Glyn-Jones, barrister, who defended, explained that on keeping lime water is apt to diminish in strength, and that the article is not much in request now.—At the Marylebone (London) Police Court, on July 30, Charles William Rushton, Praed Street, Paddington, was fined £5 and ordered to pay £5 5s. costs, on a summons by the Dental Board of the United Kingdom for continuing to practise dentistry after his name had been removed from the Dentists Register because he had failed to pay the annual subscription of £5.

Scottish News

Brevities

Following upon his recent successes at B'sley, Mr. D. W. oster, pharmacist (secretary of the Dunblane Miniature ifle Club) has been invited to return to London to shoot the Great Britain *v.* America match for the Dewar hield.

A machinist, John McCulloch, aged thirty, 13 Dunn reet, Dalmuir, was found on July 27 lying unconscious the Clyde-side at Dalmuir, suffering from lysol poisong. He was at once removed to the Western Infirmary, here he died.

At a meeting of the Fife County Insurance Committee, eld at Kirkcaldy on July 28, it was stated that a sum of 3,190 15s. had been paid in sickness and disablement enefits to the members of the Scottish Miners' Federation pproved Society in the Fife area from May 3 to June 14, hilst for the corresponding period of last year the amount xpended on these benefits was £1,913 13s. 11d. The inion was expressed that some doctors were sympathisig with the men on strike in the mining areas and certifyig them. Dr. Douglas (Cupar) said that he thought the est course would be for him to bring the matter before he next meeting of the Panel Committee, and have warngs sent to all the practitioners in Fife.

Edinburgh

Harkness, Beaumont & Co., Ltd., wholesale druggists, has been converted into a private limited company (see p. 234). The partners of the firm, Mr. W. L. eaumont and Mr. R. J. Goudie, are respectively chairan and managing director of the company. The opporunity has been taken of recognising a number of the esponsible members of the staff by giving them shares n the new company and electing three of them as irectors—namely, Mr. John Jas. Laurence, Mr. Jas. inlayson, and Mr. Matthew Gowans.

Glasgow

A man walked into Camperdown Police Office, Glasgow, nd after informing the bar officer that he had just come rom an asylum, produced a bottle of lysol and drank a uantity. He was taken to the Royal Infirmary and ater removed to Duke Street Hospital.

At the Glasgow Sheriff Court, on July 28, Joseph Douglas (30), Waterloo Street East, was fined £100 or hree months' imprisonment on a charge of making wash" and having an illicit still The Procurator-Fiscal stated that in that district offences of this kind vere becoming very numerous, and that big profits were eing made in consequence of the heavy duty on spirits.

Irish News

Brevities

Mr. J. E. O'Neill, J.P., R.D., Maghera, and a nember of the Council of the Pharmaceutical Society of Northern Ireland, served on the Grand Jury at the openng of co. Londonderry Assizes on July 30. Mr. O'Neill was subsequently appointed a member of the visiting committee of Belfast gaol to represent Londonderry County.

Dublin

It is reported in Dublin that Lever Bros., Ltd., Port Sunlight, have acquired extensive premises at the North Wall, Dublin, where they are to open a large modern soap works. Plans for the new buildings have been prepared.

In the District Court, on July 23, a summons at the suit of Mrs. Rutland, as Inspector of the Pharmaceutical Society of Ireland, against Mr. William George West, registered druggist, was listed for hearing. The defendant was charged with having on January 9, at 36 Lower Camden Street, Dublin, kept open shop for compounding or dispensing medical prescriptions, contrary to Section 30 of the Pharmacy Act (Ireland), 1875. The district justice (Mr. Collins) stated that in that court the complaint must be determined within six months. He had no jurisdiction as to costs.

Legal Reports

The Construction of a Covenant.—In London, on July 29, the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Warrington and Scrutton, heard the appeal of the plaintiff in the case of Frampton v. Gillison and others from a judgment of Mr. Justice Lawrence, in the Chancery Division (*C. & D.*, July 3, p 5). refusing to grant an interlocutory injunction restraining the defendants, Dr. Gillison and Sterling & Sons, Ltd., chemists, from committing an alleged breach of a restrictive covenant contained in the conveyance of premises at Bromley Hill, Kent, by opening a post office in a chemist's shop. The defendants' case was that a post office was not a trade which came within the purview of the restriction, and Mr. Justice Lawrence so held, and dismissed the application. Mr. Beyfus, for the appellant, contended that the carrying on of the post office by a sub-postmaster was the carrying on of a trade within the meaning of the covenant, and ought to be restrained. Without calling upon counsel for the respondents, their lordships held that the duties of a sub-postmaster were so limited that it was a misnomer to say that he was carrying on a trade. A sub-postmaster was a subordinate of the Postmaster-General on definite terms. His remuneration was fixed, and did not depend on his trading abilities. He could not charge more for his services than a fixed amount, or obtain more by excess of zeal or industry. The decision of Mr. Justice Lawrence was accordingly affirmed; and as the appellant agreed to treat the motion as a trial of the action, judgment was accordingly entered for the defendant, with costs.

Bankruptcy Reports

Re **Ernest William Stanley Parkes,** 458 Corporation Road, Newport, chemist and druggist.—The first meeting of creditors was held on July 29 at 34 Park Place, Cardiff. Debtor attributed his failure to trade depression and lack of working capital. No statement of affairs was presented, and the estate remains in the hands of the Official Receiver as trustee.

Gazette

RECEIVING ORDER

BARRETT, J. T., "Razmak," Park Road, Watford, and lately at 68 Queen's Gardens, Hyde Park, London, retired chemist.

Partnership Dissolved

PHILLIPS, A. J., and DAVIDSON, A., 13 Gledhow Terrace, South Kensington, S.W., chemists, under the style of Plaister & Co.

Recent Patents

Abstracts of specifications of recently-granted patents for inventions. The complete specification (1s. each including postage) of any British patent can be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, on quoting the name of the patentee and the number of the patent.

Unsplinterable Glass.—Itaconic acid methyl (or ethyl) ester is partially polymerised by heating it to 115° C. This liquid is used as a cement to unite two or more layers of glass with an intermediate layer of transparent acetyl cellulose. (E. Hope. 254,668.)

Photographic Emulsions.—A process of manufacturing high-speed photographic silver halide emulsions, consisting in adding a thiazole, e.g., thiazole yellow, compound to the gelatin before preparing the emulsion. (Actien-Gesellschaft für Anilin-Fabrikation. 246,800.)

Urea Derivatives.—A process for the manufacture of *p.p'*-diamino-diphenyl urea or its derivatives symmetrically substituted in the nuclei, consisting in causing urea to react with *p*-phenylene-diamine or its derivatives substituted in the nucleus. (I. G. Farbenindustrie Aktiengesellschaft. 254,667.)

Retail Pharmacists' Union

A MEETING of the executive was held at 19 Tavistock Square, London, W.C.1, on July 27, Mr. A. E. Young in the chair. There were also present Messrs. Clubb, Forster, French, Gilleghan, Hardy, Jackson, Marshall, Martin, Melhuish, Phillips, Rowsell, Smalley and Tranmer.

ASSISTANTS' TERMS OF EMPLOYMENT.—This matter was discussed, and it was decided to recommend that all employers at the time of engagement should agree with the employee regarding the following: (1) Wages. (2) Hours. (3) What wages will be paid under the following conditions: (*a*) Absence from business without leave. (*b*) Absence from illness or accident *not* arising out of the business. (*c*) Absence from illness or accident arising out of the business. (4) Holidays. (5) Conditions under which the employment is terminated: (*a*) Notice required. (*b*) Absence without leave.

INDUSTRIAL METHYLATED SPIRIT.—As a result of further negotiations it has been arranged that the prescriptions and orders need not be retained, and that Insurance prescriptions need not be copied, provided there is a record made in the Spirit Register of the amount of industrial methylated spirit which has been dispensed. Further, there is no need for the doctor's address on the prescription form, and the usual address of the patient, i.e., number and name of street, is all that is necessary.

New Companies
and Company News

P.C. means Private Company and R.O. Registered Office

MELLOR & CO. (WARWICK), LTD. (P.C.).—Capital £5,000. Objects: To acquire the business carried on by J. G. Mellor as "Mellor & Co." at 62 Cornmarket Warwick, as pharmaceutical chemists and druggists and manufacturers of aerated and mineral waters, etc. The directors are: J. G. Mellor, H. D. Fallows, and W. G. Mellor. R.O.: 62 Cornmarket, Warwick.

HARKNESS, BEAUMONT & CO., LTD. (P.C.).—Capital £40,000. Objects: To carry on the business of chemists, druggists, drysalters, oil and colour men, paint and colour grinders, exporters, importers and manufacturers, etc. The directors are: W. L. Beaumont, 1 Gayfield Place, Edinburgh; R. J. Gondie, "Beulah," 166 Newhaven Road, Leith; J. J. Lawrence, 32 Bonnington Grove, Edinburgh; J. Finlayson, 1 Glebe Gardens, Corstorphine, Edinburgh; and M. Gowans, 24 Jameson Place, Leith. R.O.: 253 Great Junction Street, Leith.

J. HUNTER SMITH & CO., LTD., wholesale and retail druggists, 8 Glassford Street, Glasgow.—A meeting of creditors in this voluntary liquidation was held in Glasgow on August 2, with Mr. Maurice Crichton, C.A., the liquidator, in the chair. A statement of affairs was submitted which disclosed liabilities of £7,247 5s. 8d., of which £3,642 3s. 7d. was due in respect of cash claims, while there were trade creditors amounting to £3,604 2s. 1d. The assets consisted of: fittings and furnishings £3,676 18s. 4d., estimated to realise £1,000; stock-in-trade, £2,098 16s. 9d.; book debts £372 19s. 1d., expected to produce £350; and cash in hand and at bank £48 7s. 8d., making total assets of £3,497 4s. 5d., from which had to be deducted £350 for preferential claims, leaving net assets of £3,147 4s. 5d., or a deficiency of £4,100 1s. 3d. The estate thus showed an apparent dividend of 8s. 8d. in the £, subject to contingencies and expenses of realisation. There were contingent claims amounting to £4,750 in respect of possible claims by bondholders on certain heritable property valued at £6,850 15s. 10d., but nothing was included in the liabilities in that regard. A meeting of the principal trade creditors held previously expressed the opinion that the business should be continued. It was decided to confirm the voluntary liquidation of the company. A committee was nominated consisting of Mr. Robert Graham (T. & H. Smith, Ltd.), Mr. Robert Dykes, Mr. James Stirrat, and Sir Archibald Craig, the business to be continued under the supervision of the liquidator and committee.

Stock Exchange Prices

£1 Shares unless otherwise stated	Dec. 30, 1925		June 29, 1926		July 1926	
	s.	d.	s.	d.	s.	d.
Allen & Hanburys, 7% Prefd. Ord.	20	9	21	0	21	
Amalg. Dental Co. 8% Prefd. Ord.	19	3	19	0	19	
,, ,, Deferred 5s. ..	7	0	5	6	5	
Apollinaris and Johannis, Ord. £1..	9	3	7	6	7	
Ayrton, Saunders & Co., 7½% Pref.	13	6	13	0	13	
Beecham Estates & Pills, 8% Cum. Prf.	21	3	21	0	20	
Benger's Food, Ord.	33	6	33	6	31	
Boake (A.), Roberts & Co., 5% Pref. £10	£6¾		1 £6½		£6¾	
Boots Pure Drug, Ord.	172	6	25	0	122	
Boots Pure Drug, 7% "A" Prefd. Ord.	24	0	24	0	24	
Boots Cash Chemists (Southern), 6% "A" Pref.	22	0	21	9	21	
Borax Consold., Defd. Ord. ..	35	0	33	9	34	
Bovril, 6% Pref.	21	6	22	0	22	
,, Ord.	23	6	24	0	24	
,, Defd...	47	6	43	9	40	
British Celanese, Ord.	8	3	4	6	3	
,, ,, 7½% Pref. ..	11	3	6	9	5	
British Cyanides, Ord.	3	3	3	9	2	
British Drug Houses, The, Ord. ..		—	21	0	20	
British Dyestuffs Corpn., Ord. ..		—	8	7½	9	
British Glues and Chemicals, Ord.	4	3	3	6	3	
,, ,, ,, 8% Pref.	17	0	15	0	15	
British Oil and Cake Mills, Ord. ..	27	6	27	3	26	
British Oxygen, Ord.	28	0	27	6	25	
British Photographic Industries, 6% Cum. Pref.	6	3	7	6	7	
Brunner Mond, Ord.	37	3	35	9	35	
,, ,, 7½% Pref.	26	6	27	9	28	
Bush (W. J). & Co., 5% Pref. £5 ..	65	0	65	0	65	
Cadbury Bros., 6% Pref.	23	6	23	0	23	
Callard, Stewart & Watt, Ord. ..	31	3	32	6	36	
,, ,, ,, 5½% Pref.	17	3	18	6	19	
Crosfield (Joseph) & Sons, 6½% Pref.	18	9	18	6	18	
Dubarry Perfumery, Ord., 1s. ..	7	6	8	0	8	
,, ,, 7½% Pref. ..	18	9	19	6	19	
Eastman Kodak Com. (no Nom. value)	$113½		$115		$117	
Evans Sons Lescher & Webb, Ord. 6s. 8d. shares	—		4	3	4	
,, ,, ,, 5% Pref.	—		4	9	5	
Field (J. C. & J.), Ord.	14	9	12	6	11	
,, ,, 7% Pref. ..	20	0	19	3	18	
Gossage (William), 6½% Pref. ..	19	0	18	3	18	
Grout & Co., Ord.	70	0	57	6	47	
Heppells, 7% cum. partie. Pref. ..	17	6	19	9	19	
Idris & Co., "A" Ord.	18	9	18	6	19	
Ilford, Ltd., Ord.	25	0	23	9	24	
,, 6% Pref.	19	0	19	4½	18	
Intern. Sponge Importers, 6% Pref.	11	3	11	3	10	
Kent (G. B.) & Sons, 5½% Pref. ..	13	0	13	0	12	
Knight (John), 25% Prefd. Ord. ..	60	0	63	1½	61	
Laporte (B.) & Co., Ltd., Ord. ..	21	3	21	3	20	
Lever Bros., Ltd., 7% Pref. ..	20	3	20	0	19	
,, ,, 8% Pref. ..	20	0	19	3	18	
,, ,, 20% Prefd. Ord. 5s.	10	6	10	1½	10	
Liebig's Ext. of Meat, Ord. £5 ..	£16¾		£17⅝		£17½	
Mellin's Food, 6% Pref.	12	6	12	6	12	
Mond Nickel Co., Ord.	37	0	37	6	40	
,, ,, 7% Cum. Pref. ..	25	0	23	3	24	
Nathan (Joseph) & Co., 7% Pref.	14	6	15	0	15	
,, ,, 8% Prefd Ord.	6	9	8	6	8	
National Drug and Chem. Co. of Canada, 6½% Pref.	4	3	7	3	7	
New Transvaal Chemical Co. 6% Pref.	16	6	17	0	17	
,, ,, ,, 8% Pref.	18	9	20	3	21	
Salt Union, Ord.	31	9	29	0	28	
,, Pref.	30	0	29	9	30	
"Sanitas," The, Co., 9% Pref. ..	22	6	25	0	24	
Schweppes, Ltd., Ord.	22	6	22	6	22	
,, ,, Defd.	37	6	37	9	38	
Smith (Stephen) & Co., 6% Pref. ..	33	1½	32	6	32	
Southall Bros. & Barclay, Ord. ..	52	9	56	0	56	
,, ,, 5% Pref.	18	9	18	0	17	
Spratt's Patent, Ord.	50	0	38	9	41	
Stevenson & Howell, 6½% Cum. Pref.	21	3	21	3	21	
United Alkali, Ord.	35	0	30	6	32	
United Glass Bottle Man., 6% Mt. Deb. Stk., £100	£95		£95		£95	
Venesta, Ltd., Ord.	23	9	24	9	25	
,, 7% Pref.	20	0	20	0	20	
Veno Drug Co., 8% Pref.	19	6	19	3	18	
Virol, Ltd., Ord.	82	6	85	0	88	
,, 7% Pref.	21	9	22	3	22	
White (A. J.), Ltd., Ord. 10s. ..	8	6	9	9	9	
White (R.) & Sons, 6% Pref. ..	17	0	17	0	17	
,, ,, Prefd. Ord. 10s.	7	6	7	6	7	
Wright, Layman & Umney, 6% Pref.	18	9	19	0	18	

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THE PAPERS

etermination of Morphine in Poppy Extracts

C. T. BENNETT, B.Sc., F.I.C., F.C.S., AND DONALD C. GARRATT

[ABSTRACT]

PARATIONS of poppies containing 0.2 per cent. of phine, which are subject to the regulations of the gerous Drugs Acts, include solid and liquid extracts oppies and concentrated liquors for the preparation syrup of poppies. The statement in the British rmaceutical Codex that poppy capsules contain from to 0.28 per cent. of morphine is in accordance with rminations made on poppy extracts prepared in the ratories of Wright, Layman & Umney, Ltd. This ation makes it desirable that some standard should dopted for concentrated liquors made from poppies, before this can be done a suitable method of assay equired. A special method for the determination of phine in poppy extracts has apparently not been lished, and considerable difficulty was met with in ying B.P. methods for assay of morphine in opium parations to poppy extracts, a magma being formed h lime and water which is difficult to filter, even er considerable pressure, while the peculiar nature of filtrate prevents a clean separation of morphine r. Experiments with Tickle's method for esti- ing morphine in cough mixtures, using a mixture of ol and amyl alcohol as solvent, gave concordant lts, but the time for separation was too long routine work, several days being required to com- e an estimation. Alcohol (90 per cent.) was found xtract the morphine from poppy extracts, these being rally acid in reaction, and isopropyl alcohol also e identical results. The following process is suggested a rapid and accurate method for the determination morphine in preparations of poppies.

uid Extract of Poppies and other Liquid Preparations

ransfer 40 c.c. of liquid extract to a stoppered 250 c.c. k, add 20 c.c. distilled water and 150 c.c. isopropyl hol. Shake vigorously for one minute, and allow to d five minutes. Pour off the alcoholic layer, and repeat extraction with 50 c.c., 20 c.c., and 20 c.c. of isopropyl hol. Shake the alcoholic extracts together, and filter ough cotton wool. If the residue after the first extraction h isopropyl alcohol is solid add 20 c.c. water to liquefy ore proceeding with the subsequent extractions. ecover the alcohol by distillation, evaporate to dryness, l mix the residue with 1.5 gms. slaked lime and 40 c.c. ter. Then shake at intervals for half an hour, and filter 25 c.c. Add 2.5 c.c. alcohol (90 per cent.), and 15 c.c. er. Shake and add 0.65 gms. ammonium chloride, and ke well for half an hour. Allow to stand twelve hours, ur off the ether layer through a filter, add further 10 c.c. er, and again pour off. Wash filter with 20 c.c. ether and w to dry. The morphine precipitate is then trans- red to the filter paper, and washed with morphinated ter as in the B.P. process. Remove excess of moisture m the filter paper by pressing between folds of blotting per, transfer filter and contents to a 100 c.c. flask, dis- ve the morphine in 20 c.c. decinormal sulphuric acid, d a few drops of methyl red solution, and titrate back h decinormal solution of sodium hydroxide. Conduct a nk experiment with a filter paper moistened with rphinated water, and pressed between folds of blotting per. Calculate the amount of morphine using the B.P. tor, and add the correction as set out under "Tincture Opium."

Solid Extract of Poppies

Weigh 40 gms. of extract into a stoppered 250 c.c. flask d add 20 c.c. of distilled water. Mix thoroughly by rming and shaking. Add 100 c.c. isopropyl alcohol, ake vigorously for one minute, and allow to stand five nutes. Pour off the alcoholic layer. Reliquefy the idue with 20 c.c. distilled water, and shake again with 100 c.c. isopropyl alcohol. Add a further 10 c.c. of distilled water to the residue, again extract with 50 c.c. isopropyl alcohol, and finally with a further 20 c.c. isopropyl alcohol. Shake the alcoholic extracts together, and filter through cotton wool. Evaporate to dryness, add 1.5 gms. slaked lime and 40 c.c. distilled water. Filter off 25 c.c., and proceed as indicated above.

The following are the results of experiments conducted to test the accuracy of the process :—

Raw Opium

	Morphine
(*a*) B.P. process	12.8 per cent.
(*b*) Tincture made and assayed by B.P. process	12.2 per cent.
(*c*) Suggested method	12.0 per cent.

Tincture of Opium

	Morphine per 100 c.c.
(*a*) B.P. process	0.97 gms.
(*b*) Suggested method after addition of 1 c.c. acetic acid 33 per cent. ...	0.97 gms.

Liquor Papaveris pro Syrup 1-7

	Morphine per 100 c.c.
(*a*) Tickle's process, modified	0.334 gms.
(*b*) Suggested method (1)	0.350 gms.
(2)	0.356 gms.
(*c*) Suggested method (0.5 per cent. morphine added)	0.86 gms.

Extract Papaveris

	Morphine
(*a*) B.P. process (using 10 grammes slaked lime, separations very difficult)	0.73 per cent.
(*b*) Tickle's process modified	0.70 per cent.
(*c*) Suggested method	0.70 per cent.
Suggested method (0.5 per cent. morphine added)	1.17 per cent.

Attention is called to the fact that syrup papaveris, B.P.C., is a weaker preparation than syrup papaveris, B.P. 1885, the former containing 18 grammes, the latter approximately 45 grams of poppy capsules in 100 c.c., this being the strength of extractum papaveris liq., B.P.C. It is desirable to have an official syrup of poppies containing a definite proportion of morphine. The following standards are suggested :—

	Morphine per 100 c.c.
Syrup papaveris	0.05 gms.
Liquor papaveris pro syrup 1-3	0.20 gms.
Liquor papaveris pro syrup 1-7	0.40 gms.
Extr. papaveris liq.	0.20 gms.

The experimental work recorded above was conducted in the analytical laboratory of Wright, Layman & Umney, Ltd.

The Dissociation and Volumetric Estimation of the Cinchona Alkaloids

By C. MORTON, B.Sc.

[ABSTRACT]

IN the discussion of ionic equilibria in aqueous solutions of quinine, quinidine, cinchonine, and cinchonidine it is pointed out that with these divalent bases only the first stage of ionisation is appreciable at moderate dilutions, and that methods of calculating the second stage constant (K_2) is inapplicable, owing to sparing solubility, so that only half the titration curve can be realised experimentally. On the assumption that the law of mass action applies to the ionic equilibria, it is calculated that the second stage of ionisation is inappreciable in dilute solution only when K_2 is negligibly small compared with the concentration (C) of the base. Measurements of the hydrogen ion concentration of solutions of *dihydrochlorides* indicated that within the dilution limits this depended only on the first-stage hydrolysis.

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The *mono-hydrochlorides* of cinchona alkaloids yield almost neutral solutions, and the hydrogen ion concentration varies only very slightly with dilution.

The difference in basic strength of the four acids is comparatively slight, the order of affinity as determined electrometrically being :

Cinchonidine > Quinine = Quinidine > Cinchonine.

Owing to sparing solubility the direct titration of cinchona alkaloids cannot be realised experimentally, but theoretical titration curves can be calculated as in Figs. 1 and 2. Only in titration of strong bases with strong acids does the "equivalent point" coincide with "absolute" neutrality (i.e. $[H^{\cdot}] = [OH']$), and the weaker the base the further these are removed from each other will be the points of stoichiometrical and absolute neutrality. The titration curves of all weak bases with strong acids become superimposed whenever acid is in excess of neutrality.

The choice of indicator is governed by the rule that the hydrogen ion concentration at the selected end-point must lie within the useful colour range of the indicator, and for a sharp end-point it is necessary that this transformation is complete on the addition of a small amount of acid. In other words the point in the titration curve selected as the end-point should be that which the rate of change of $[H^{\cdot}]$ is at a maximum (as indicated by the slope of the curve). The larger the ratio of primary and secondary basic constants $\frac{Kb_1}{Kb_2}$, the sharper the end-point. When this is equal to 10^6, two drops of acid (= 1 per cent. excess) produces a tenfold increase in hydrogen ion concentration, whereas it is impossible to detect a change of PH 0.3 (corresponding to $\frac{Kb_1}{Kb} = 10^4$, and titration error of 1 per cent.) unless elaborate colorimetric comparison is used.

The titration of cinchona alkaloids presents unusual difficulty, because of difficulty of obtaining a sharp end-point, and high molecular weight magnifies any error.

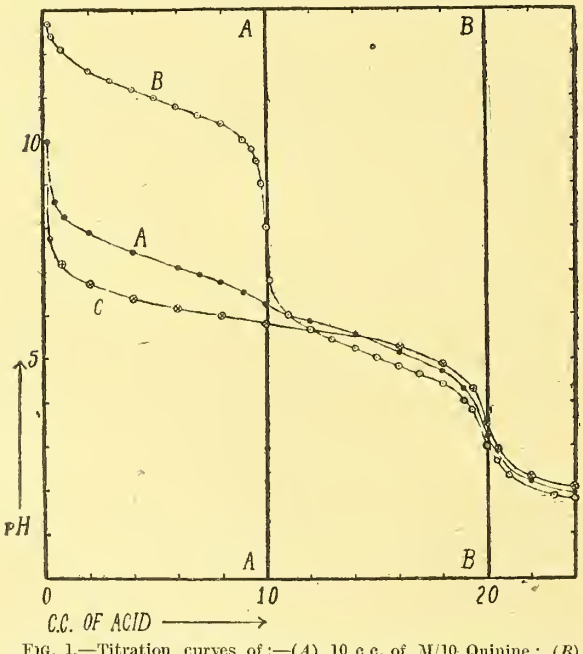

FIG. 1.—Titration curves of :—(*A*) 10 c.c. of M/10 Quinine ; (*B*) 20 c.c. of a mixture of equivalent quantities of N/10 Piperidine and N/10 Quinoline. (*C*) 20 c.c. of N/10 Morphine with N/10 HCl. AA Half-neutralisation point ; BB Equivalent point.

Evers pointed out that satisfactory end-point could not be expected in titrating quinine to phenol-phthalein, as the whole of the alkaloid was precipitated, and recommended brom-phenol blue as indicator if the formation of dihydrochloride be taken as end-point, or methyl re the half neutralisation point be selected.

Curve (A), Fig. 1 (which may be taken as represe tive of the cinchona alkaloids), represents the titratio 10 c.c. of *M*/10 quinine with *N*/10 HCl. The cu shows an almost imperceptible inflexion at the h neutralisation point, and a more marked inflexion at

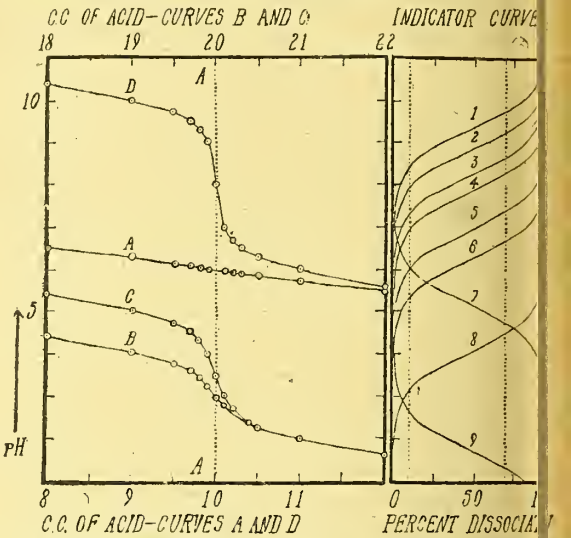

FIG. 2.—Titration Curves of :—(*A*) 10 c.c. of M/10 Quinine. 10 c.c. of N/10 Piperidine + 10 c.c. of N/10 Quinoline in the re of the half-neutralisation point. (*C*) 20 c.c. of N/10 Morphine. 10 c.c. of N/10 Quinine (or Piperidine + Quinoline) in the regio the equivalent point with N/10 HCl. AA denotes the half-neut sation point or the equivalent point, as the case may be. Disso tion Curves of Indicators :—(1) Cresol phthalein. (2) Thymol b (3) Cresol red. (4) Phenol red. (5) Brom.-thymol blue. (6) Bro cresol purple. (7) Methyl red. (8) Brom.-phenol blue. (9) Thy blue (acid range).

equivalent point, corresponding with the formation the mono- and dihydrochlorides respectively. Curve represents the titration of a mixture of 10 c.c. each *N*/10 piperidine and *N*/10 quinoline with *N*/10 HC the curve shows marked inflexions at both the half-w and equivalent points. Curves (A) and (B) follow roughly parallel course throughout the second half of titration. This is readily understood in view of presence of the quinoline nucleus in the quinine molecu Curve (C) represents the titration of 20 c.c. of *N* morphine with *N*/10 HCl. Here there is no inflex at the half-neutralisation point, but since the ba strength of morphine is of the same order as that quinoline, the curve runs parallel with that of cur (A) and (B) during the second half of the titratio when excess of acid has been added the three cur continue to take the parallel course for weak bases, previously explained.

The conditions in the region of the half-neutralisat and equivalent points are indicated in Fig. 2. Cur (A) and (D) show roughly the conditions at the ha titration point for quinine and for the mixture of pipe dine and quinoline respectively, while Curves (B) a (C) show the corresponding conditions at the equival point in the titration of quinine (or piperidine + qui line) and morphine respectively. The dissociation cur of a number of indicators are plotted alongside t curves, the useful range of the indicators lying witl the dotted lines. It is evident that, while a mixture piperidine and quinoline can be accurately titrated the half-way point with a wide choice of indicat (brom-thymol blue, phenol red, cresol red, thymol bl cresolphthalein, litmus, phenolphthalein, etc.), in the c of quinine brom-cresol purple is the only suitable in cator, and the titration error will be about 10 per ce unless a colour standard is used. If the equivalent po be selected as end-point, titration can be carried out w

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fair accuracy in all four cases (indicator brom-phenol blue).

The optimum titration conditions for the four cinchona alkaloids investigated are summarised in Table I. These conclusions have been confirmed by checking with assays :—

TABLE I.—*The Optimum Titration Conditions for the Cinchona Alkaloids in N/20 Solution*

Alkaloid	Desired end-point	PH at end-point	Indicator	Buffer solution for colour match *
Quinine ..	Monohydrochloride	6.20	Brom-cresol purple	8.60 c.c.
Quinidine ..	,,	6.19	,,	8.45 c.c.
Cinchonine	,,	6.10	,,	7.05 c.c.
Cinchonidine	,,	6.30	,,	10.50 c.c.
Quinine ..	Dihydrochloride	3.26	Brom-phenol blue	Colour match unnecessary
Quinidine ..	,,	3.28	,,	,,
Cinchonine ..	,,	3.29	,,	,,
Cinchonidine	,,	3.26	,,	,,

* Prepared by adding stated number of c.c. of M/5 NaOH to 50 c.c. of M/5 KH_2PO_4 and diluting to 200 c.c.

It is recommended that for the titration of the free bases or the monohydrochlorides the equivalent point should be selected as end-point. In the titration of the dihydrochlorides the half-way point will of necessity be used as end-point, and it is recommended that brom-cresol purple be used as indicator, with a buffer solution containing the same volume of indicator, to serve as colour match, no appreciable error being introduced unless the dilution be extreme. Since the free bases and dihydrochlorides are estimated by indirect titration, i.e., by adding a known excess of standard acid and back-titrating with standard sodium hydroxide, the solution at the end-point contains sodium chloride, and the end-point is displaced by the influence of the common ion. McGill has shown that this effect is negligible if excess of acid was not too great. The hydrochlorides to which varying amounts of sodium chloride had been added showed that the effect was negligible, provided not too great an excess of acid were used.

This research was done at the School of Pharmacy, Chelsea Polytechnic, with the aid of a grant from the Dixon Fund by the Senate of the University of London.

Comparison of the Methods of Assay of Belladonna Leaves

By CHARLES M. CAINES, F.I.C., AND NORMAN EVERS, B.Sc., F.I.C.

[ABSTRACT]

The present investigation was undertaken with a view to obtaining comparative results between the various methods in use for the assay of belladonna leaves, having in view the recommendation of the process most suitable for adoption as an international standard method based upon actual comparative results. Four official and two non-official methods are summarised in Table I.

The results of assay upon a large sample of powdered English belladonna leaves of good quality which was used throughout the determinations are given in Table II.

TABLE II

——	Volumetric		Gravimetric	
B.P.	0.405	0.39	0.50	0.44
U.S.P.	0.42	0.39	0.44	0.435
P.G. V	0.42	0.40	—	—
Dutch	0.36	0.385	0.44	0.455
Panchaud	0.14	0.04	0.21	—
Auenmuller ..	0.384	0.42	—	—

DISCUSSION OF METHODS

The B.P. 1914 method gives very satisfactory results. The complete extraction of the alkaloid by percolation takes a considerably longer time than when an aliquot portion of the solvent is taken, but is probably more certain in accuracy. The menstruum (chloroform, 1 : ether, 4) is very satisfactory and causes little emulsification, being in this respect much better than the U.S.P. menstruum (chloroform, 1 : ether, 3). The titration would probably be slightly more accurate if *N*/50 sodium hydroxide were used for the titration, and if methyl red were used as an indicator instead of cochineal.

The U.S.P. X method closely resembles the B.P. except as regards solvent, which emulsifies badly and considerably lengthens the process.

The P.G. V method has many shortcomings. The use of ether as a solvent; of sodium hydroxide for making alkaline; and of sodium carbonate solution during the final extraction; have all been the subject of condemnation by previous writers. The use of *N*/100 acid and alkali for titration is unnecessary. The single extraction with 20 c.c. of *N*/100 acid does not always remove the whole of the alkaloid.

The Dutch Pharmacopœia method relates to an extract, but can be carried out on the leaves by preparing an extract with 70 per cent. alcohol. The direct extraction with dilute acid gives a highly coloured solution, and the separated alkaloid is highly coloured, making the end-point of the titration more difficult to observe. The use of tragacanth also is troublesome. The results are low.

Panchaud's method for assay of belladonna leaves employs ether as a menstruum, using 120 gm. of ether to 10 gm. of the drug, and adding 10 c.c. of dilute ammonia. This quantity of ammonia is largely in excess of what is required, and possibly accounts for the seriously low results obtained, which preclude its recommendation.

Auenmuller's Method.—Apart from the fact that the results obtained are sometimes slightly low, this process is expeditious and easily manipulated.

The official indicators are cochineal, methyl red, iodeosin, and hæmatoxylin, but the authors find that methyl red is to be preferred, both on account of the sharpness of the end-point and for its accuracy. Cochineal, the B.P. indicator, does not give results quite so consistent as methyl red.

SUMMARY

The conclusion attained is that except for the time required, and the need for slight alterations in the method of titration, there is not any assay process to equal that of the British Pharmacopœia.

Thanks are accorded to Allen & Hanburys, Ltd., in whose laboratories this work was carried out.

TABLE I

——	Weight of drug taken	Weight used for assay	First extraction		Second extraction			Indicator
			Menstruum	Alkali used	Solvent	Standard acid used	Standard alkali used	
B.P. ..	10	10	Chloroform 1 Ether 4	2 c.c. Ammonia 3 c.c. water	Chloroform	N/20	N/20	Cochineal
U.S.P. X	10	10	Chloroform 1 Ether 3	5 c.c. Ammonia	Chloroform	N/10	N/50	Cochineal or Methyl Red
P.G. V	20	10	Ether	5 c.c. Sodium hydroxide 15 per cent.	Chloroform	N/100	N/100	Iodoeosin
Dutch ..	3*	3	Dilute sulphuric acid	—	Ether	N/100	N/100	Hæmatoxylin
Panchaud	10	5	Ether	10 c.c. Ammonia	Ether	Gravimetric		
Auen-muller	15	5	Alcohol 60 per cent.	—	Ether	N/100 HCl	—	Hæmatoxylin

* Solid extract prepared with 70 per cent. alcohol.

The Assay of Extract of Aconite

By C. W. Cornwell and A. J. Jones, Ph.C., A.I.C.

[Abstract]

An extract of Japanese aconite supplied to a standard of 3 per cent. of ether-soluble alkaloids gave a considerably lower value upon making a confirmatory assay. The ensuing correspondence made it clear that there were factors not easily traceable which were responsible for the discrepancies between analyses, viz.: Makers, 3.4 per cent. by weight and 3.0 per cent. by titration; another analyst, using U.S.P. IX method of assay, 3.23 per cent. by titration; and the authors' assay, (*a*) 2.2 per cent. and (*b*) 2.36 per cent. by weight and 2.57 per cent. by titration in both assays. The preliminary treatment of the extract with petroleum ether produced a heavy sticky clot, but an improvement was effected by adding a little alcohol before adding petroleum ether, the subsequent assay yielding 3.32 per cent. by weight and 3.42 per cent. by titration. The manufacturers, in a re-examination, adhering strictly to the B.P. process, found (*a*) 2.68 per cent. and (*b*) 2.30 per cent. by weight and (*a*) 2.89 per cent. and (*b*) 2.49 per cent. by titration, which is in fair agreement with the authors' first findings

A solution of the extract, freed from fat by petroleum ether, was divided into two parts, half being sent to the makers for their usual assay and for estimation after adding 5 c.c. of alcohol (s.v. meth.) to 20 c.c. of the aconite solution. The results are tabulated below, both for original assay and subsequent re-extraction after evaporating to remove alcohol.

Assay without alcohol present

	Authors'		Makers'	
	Weight Per cent.	Titration Per cent.	Weight Per cent.	Titration Per cent.
On first assay ..	2.50	2.70	2.98	3.11
On re-extraction ..	1.59	1.68	—	2.87
After repetition ..	1.25	1.37	—	—

Assay with alcohol present

	Authors'		Makers'	
	Weight Per cent.	Titration Per cent.	Weight Per cent.	Titration Per cent.
On first assay ..	2.75	2.90	3.37	3.35
On re-extraction ..	1.59	1.68	—	2.87
After repetition ..	1.17	1.17	—	—

Disagreement between results raised the following points :—

(1) The difference caused by using ether and water, as compared with ether, water and alcohol (of importance because it is usual to use small quantities of alcohol to facilitate solution and separation).

(2) Whether so-called "ether-insoluble" alkaloids also pass into the ether layer under assay conditions.

(3) Whether an optimum ratio exists between ether used and alkaloid extracted.

(4) The effect of the "partition co-efficient" (as between water saturated with ether, and ether saturated with water).

(5) The effect of "treatment" of the alkaloid in causing loss by decomposition on re-extraction.

In the following experiments a solution of the extract was prepared, treated with petroleum ether, and portions taken representing 4 grams of the original extract :—

Experiment 1.—After addition of ammonia, the aqueous solution, which measured 55 c.c., was extracted with ether followed by chloroform, in portions as below :—

	Alkaloid in milligrams	Per cent. by titration		Alkaloid in milligrams	Per cent. by titration
Ether—			Ether—		
30, 30, 20, 20 c.c. ..	97	2.78	60, 60, 40, 40 c.c. ..	116	3.14
Chloroform—			Chloroform—		
20, 10, 10, 10 c.c. ..	48	1.49	20, 10, 10, 10 c.c. ..	36	1.00
	145	4.27		152	4.14

The evidence is that ether-insolubility of the mixed alkaloids is relative to amount of solvents used.

Experiment 2 consisted of a series of extractions from 50 c.c. of the aconite solution, and compared w another 50 c.c., *plus* 10 c.c. of alcohol (s.v. meth.).

50 c.c. aconite solution			50 c.c. aconite solution + 10 alcohol		
Ether used, c.c.	Alkaloid in milligrams	Per cent. by titration	Ether used, c.c.	Alkaloid in milligrams	Per ce by tit tion
50, 25, 25	110	2.90	50, 25, 25	123	3.34
50	8.0		50	9.5	
50	5.0		50	4.5	
50	4.5		50	4.0	
50	1.5		50	1.5	
50	2.0	0.56	50	1.5	0.48
	131	3.46		144	3.82
Chloroform—			Chloroform—		
25, 25, 25	20	0.56	25, 25, 25	18	0.48
	151	4.02		162	4.30

This confirms the previous indications that the amou of alkaloid found varies with the quantity of eth employed and the number of extractions. It wou also appear that 13 milligrams of a basic body is yield to the first 100 c.c. of ether, which is insoluble in bo ether and chloroform in the absence of alcohol. T comparative tests were made with crystallised aconitir and of the alkaloidal residue from 50 c.c. of aconi solution, the ethereal solutions (50 c.c.) being shak with 50 c.c. of water at frequent intervals over a da The separated ethereal solution on evaporation gave t following weights of residual alkaloid :—

	Aconitine cryst.	Alkaloids from extract
Quantity taken	100 mgms.	126 mgms.
Quantity in the ether	90 ,,	67 ,,
Quantity in the water	10 ,,	60 ,,

The aqueous layer measured 55 c.c. In the case pure aconitine, the amount of alkaloid in the aqueo layer is exactly proportional to the amount of ether di solved in the water. This gives a partition ratio for pu aconitine :—

Water sat. with ether : Ether sat. with water : : 1 : : *for pure aconite.*

The corresponding value is 10 : 14 for the galenical alk loids, which shows that in the mixed product the is a considerable amount of material which is not acon tine, although it is "ether-soluble." The titratio figures are in excess, but agree closely to calculatio if the residue is taken as benzoyl-aconine. Hen it would appear that, taking into consideratio the similarity between the alkaloids from Japanese an the official aconite roots, decomposition of alkaloi may occur both in the root and in the galenical durin manufacture or storage. Consequently, the question aris as to specific details of assay. A "shake-out" test wit ether gave a solubility of 1 of aconitine in 64 of ethe With the usual quantities of material taken for assay, by limiting the amount of the aqueous solutio to 25 c.c., the whole of the aconitine should be extracte by 12½ c.c. followed by four lots each of 10 c.c of ether, the total volume of ether drawn off being 50 c.c

The ether-soluble alkaloid (not aconitine) left in th aqueous layer would depend upon the degree of alkaloid degradation; but the amount of alkaloid extracted woul contain a higher proportion of aconitine than would b the case of the *total* ether-soluble alkaloids were taker To this extent, it should be a nearer approach t measuring the real aconitine value, but the questio then arises: When "ether-soluble alkaloids" are se up as a standard, should "total" or "partitioned" ether-soluble alkaloids be determined?

Experiment 3 investigated the effect of digestio with dilute acid, 50 c.c. of the aqueous preparatio being extracted with ether, and the recovered alkaloid titrated. The titrated solutions were adjusted to 60 c.c and so arranged that Flask "A" contained 1 drop o $N/20$ acid in excess, and Flask "B" represented 60 c.c at $N/100$ acidity. Both flasks were corked and heate in an electric oven at 60° C. for one hour. The solution

ere then each extracted with ether (four lots of 50 c.c. ch), and then with chloroform. The results were:—

	Solution nearly neutral		Solution with N/100 acidity	
	Weight	Titration	Weight	Titration
iginal ether soluble alkaloid	127 mgms.	141.5	126 mgms.	140
tracted by ether (after digestion)	97 ,,	99.7	78 ,,	85.3
tracted by chloroform (after digestion) ..	12 ,,		10 ,,	
	109 mgms.		88 mgms.	

The figures indicate that the degradation is partial, d due to something other than aconine, since this is luble in chloroform, and there is no increase in chloro- rmic extraction accompanying the decrease in ether- lubility. The authors conclude: "The whole question the evaluation of aconite should be opened up for iticism, and that some definite scheme for the general alysis of aconite and its preparations requires to be epared." The investigations were carried out in the alytical laboratories of Dakin Bros., and includes some says by Mr. Edmonton supplied by Mr. Harold Deane.

Absorption of Atmospheric Moisture by the Standardised Dry Extracts of the British Pharmacopœia

By Frank Wokes, B.Sc., A.I.C.

[Abstract]

RY extracts were introduced into the British Pharma- ppœia, 1914; but the preparations supplied by various anufacturers change gradually from loose dry powders tenaceous cakes, which, particularly as regards nux- omica or cascara extract, require more skill and labour mixing thoroughly with other ingredients in pills than ie soft extracts which they supplant. It was concluded at the change in dry extracts was due to absorption moisture, so that it was decided to investigate three ethods of storage:—

(1) In glass tubes plugged with cotton wool (i.e., open air).
(2) In glass tubes fitted with airtight (waxed) corks.
(3) In glass tubes plugged with cotton wool and stored in a siccator.

The desiccator used consisted of a round white glass r of 12 to 16 oz. capacity, with screwed neck to take n aluminium cap holding down an inner loose disc of luminium carrying a rubber washer, which makes ractically an airtight fit when the cap is screwed down rmly. This is equally as effective as a laboratory esiccator with ground glass joint. The desiccating gent recommended is calcium chloride rendered nhydrous by heating to 260° C. and transferred as soon

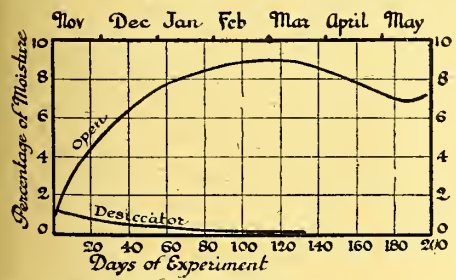

Fig. 1.—Absorption of moisture by ext. cascaræ sagradæ siccum, B.P.

s cool to the thoroughly dry jar. A waxed cardboard isc placed over the calcium chloride supports the glass ubes under test. A tube of white anhydrous copper ulphate serves as indicator for moisture, this salt hanging colour when the relative humidity approaches per cent. The extracts (1 gram or more) were stored n tared glass tubes and weighed every seven or eight ays. In the first two methods of storage, the tubes ere protected from dust in an open cardboard box, llowing free access of air, with a relative humidity varying from 50 to 70 per cent., as measured by a wet and dry bulb hygrometer. It may therefore be assumed that the condtions of storage were at least no more favourable for the absorption of moisture

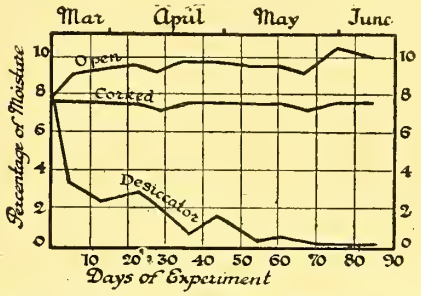

Fig. 2.—Effect of storage conditions on moisture content of extract of hyoscyamus.

than the conditions under which extracts are stored in many pharmacies. The tubes were kept in one desiccating jar (under comparable conditions), and were only removed for just as much time as was required to weigh them. The relative humidity of the air in the jar was always below 8 per cent., except at the beginning of April, when a tube containing 2 gm. of partially-dried lemon rind was inadvertently placed in the jar.

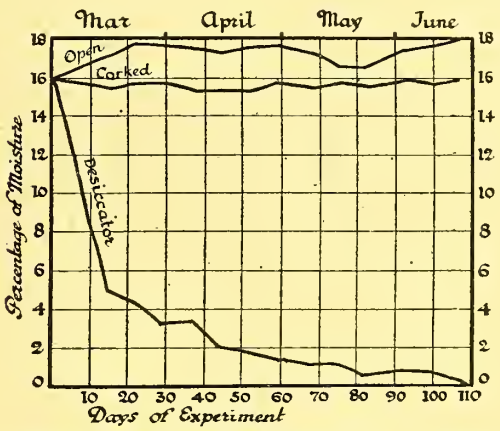

Fig. 3.—Effect of storage conditions on moisture content of dry extract of belladonna.

Although the jar contained about 30 gm. of anhydrous calcium chloride, sufficient to absorb more than 100 times the weight of moisture contained in the rind, this caused an increase in the weight of all the desiccator tubes, which is recorded in the curves. A similar occurrence later in April emphasised the necessity of avoiding the placing of even small amounts of semi-dried material into a desiccator containing more completely dried material. The extracts include highly hygroscopic

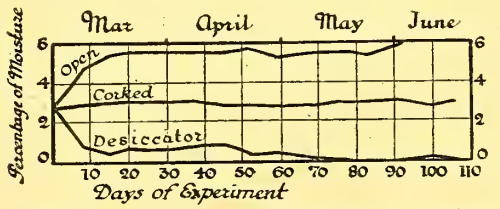

Fig. 4.—Effect of storage conditions on moisture content of dry extract nux vomica (in stock two months).

constituents, and the less moisture they contain, the more sensitive they are to slight changes in humidity.

Weighings were taken to within 2 mgm., giving an experimental error of about 0.2 per cent., any increase

or decrease in weight being calculated as a percentage of the original weight of extract taken after correction down to anhydrous weight (assuming constant minimum weight corresponded to anhydrous extract). Tests still proceeding at reduced pressure (20 mm.) in a vacuum desiccator containing phosphorus pentoxide appear to indicate that the amount of moisture left in the extracts after desiccation with dry calcium chloride does not exceed the experimental error.

Pulv. Ext. Cascaræ Sagradæ Siccum, B.P.—This extract was tested, because it gives much trouble in dispensing, the results being used to control the other experiments. Extract (received from the makers on November 8, 1925) was put into tubes on that date, and examined at frequent intervals until the following June,

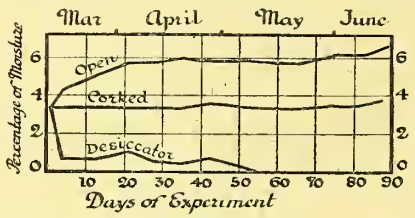

FIG. 7.—Effect of storage conditions on moisture content of dry extract of nux vomica (as from makers).

a period including the greatest variations in seasonal humidity. The curve in Fig. 1 shows that the extract exposed to the air increased in weight until the end of February 1926, when it reached a steady but very slowly decreasing level. [The slight increase at the end of May, which is also recorded on all the other curves, was due to the discontinuance of a fire in the room in which the extracts were stored.] The fact that there was a slight decrease after February showed that the factors favouring absorption of moisture were gradually decreasing in intensity. All the other extracts were not put on test until the end of February or beginning of March, and it may be assumed that any continued increase in weight was due not to increased relative humidity of the atmosphere, but to the capacity of the extract for absorbing moisture not yet being completely satisfied. At the point of maximum difference (at the beginning of March) there was nearly 9 per cent. difference in moisture content between the extract of cascara exposed to the air and that kept in a desiccator.

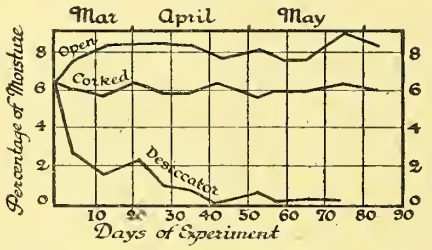

FIG. 6.—Effect of storage conditions on moisture content of dry extract of opium.

Pulv. Ext. Hyoscyami.—Sample (received in a well-corked bottle from manufacturers on January 2, 1926), was put into experiment on March 12. Differences observed in percentage moisture content were: Fifth day, 5.7; thirteenth day, 6.8; at end of five weeks, 8.6. Thus it is quite possible that an extract may have alkaloidal content lowered by unsuitable methods of storage below the Pharmacopœial limit of error in standardisation (± 5 per cent).

Pulv. Ext. Belladonnæ Siccum.—An extract (received from manufacturers November 6, 1925) was stored as directed in the Pharmacopœia in a securely-closed bottle in a cool place, until put into experiment at end of February, when it was found to contain nearly 16 per cent. of moisture. This might have been either absorbed through the cork between November and February, or present in the extract when purchased, but the experimental corked tube remained practically constant in weight for over 100 days. [The point is being re-tested on a fresh sample.] The Pharmacopœial limit of error, ± 5 per cent., was exceeded before the end of the first week, and the difference in moisture content at the end of the experiment was nearly 18 per cent.

Pulv. Ext. Nucis Vomicæ Siccum.—A.—Extract (obtained from makers January 15, 1926, and stored in a well-corked bottle) was put into experiment at end of February. Extract exposed to open air increased in weight by about 3 per cent., while the tube kept in desiccator decreased in weight by about 2 per cent. within two weeks. Maximum difference (91 days), 6 per cent. Pharmacopœial limit of error, ± 4 per cent.

B.—Extract (obtained from manufacturers March 13, 1926) was put into experiment same day. Extract exposed to open air increased by about 3 per cent., while that in desiccator decreased by about 2½ per cent. It would appear that the moisture found in the extracts was present when purchased. The extract exposed to air caked into a hard mass.

Pulv. Ext. Opii Siccum.—Extract (obtained from makers March 13, 1926) was put into experiment on the same day. Pharmacopœial limit of error, ± 5 per cent. Differences observed: In four days, 5 per cent.; in twelve days, 7 per cent.; in a month, 8 per cent. Alkaloidal content of extract when purchased, 9.9 per cent. The hygroscopic nature of the constituents of opium is of interest in connection with the suggestion

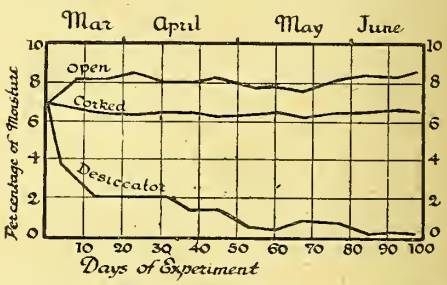

FIG. 7.—Effect of storage conditions on moisture content of powdered digitalis leaves.

by A. C. Abraham that the morphine content of opium decreases on keeping.

Pulv. Foliæ Digitalis.—An experiment with digitalis leaves (in No. 20 powder as obtained from a leading firm) showed over 6 per cent. of moisture, whereas Norman Evers states that the action of moisture on the glucosides in digitalis leaves containing 5.6 per cent. of water decreased the potency by 27 per cent. in eight months. An experiment with commercial tablets containing 2 grains of powdered leaves seemed to show a moisture content of only 2 per cent., possibly owing to imperfect desiccation, but the experiment is being repeated.

The author concludes that the results indicate the need of paying more attention to the hygroscopic properties of B.P. dry extracts. Belladonna and hyoscyamus extracts appear to be the most absorbent, and opium and nux-vomica the least hygroscopic, but even in the latter variation, due to moisture, exceeds official limits of error. As the nature of their constituents cannot be altered, methods of storage must be considered. Extracts as obtained from the manufacturers contain an appreciable amount of moisture (may be over 10 per cent.), and in well-corked bottles this moisture content would not appear to vary appreciably. Extracts kept in a desiccator over anhydrous calcium chloride for not less than two months become quite dry. Several hundred of the weighings necessitated by this investigation were carried out by Mr. J. F. Buchanan.

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Analysis of Gregory's Powder and its Constituents

By J. F. Liverseege, Ph.C., F.I.C., H. H. Bagnall, B.Sc., F.I.C., and A. F. Lerrigo, B.Sc., F.I.C.

[Abstract]

The British Pharmacopœia, 1914, requires that Gregory's powder shall contain rhubarb in powder 22 per cent., ginger 12 per cent., and light magnesia 66 per cent.

Rhubarb is required to yield not more than 15 per cent. of ash, which figure is unsatisfactory as it depends upon conditions during ignition. Liverseege suggested in 1922 that the ash be carbonated by standing with water, adding ammonium carbonate solution, and then evaporating and drying in a water oven. Analyses of 12 samples below showed variations in ash from 7.7 per cent. to 13.4 per cent., and of carbonated ash from 8.5 per cent. to 15.2 per cent.

Organic matter was obtained by subtracting from 100 the sum of the percentages of ash and water (lost in water oven). This figure for organic matter multiplied by 1.19 gives results usually somewhat lower than 100.

Acetic acid insoluble matter was determined by adding to 0.5 gm. of powder about 120 c.c. of approximately semi-normal acetic acid, shaking occasionally during the next day and filtering on the third day. After washing with cold water until a colourless filtrate was obtained, the insoluble matter was washed off the filter paper with a jet of hot water into a tared dish, and after evaporation dried in a water oven for two hours. From 46.2 per cent. to 57.2 per cent. was found.

Methylated spirit extractive was obtained by adding 70 c.c. of industrial methylated spirit to 0.7 gm. of rhubarb, shaking occasionally and filtering the next day, 50 c.c. of the filtrate being evaporated and dried in a water oven. From 33.8 per cent. to 42.6 per cent. was found.

Water Extract.—The following experiment was made to ascertain the influence of temperature and strength on water extract as difficulty was met with in getting consistent duplicates for this figure: 1.5 and 0.75 gm. of rhubarb were each shaken with 150 c.c. of water, and filtered the next day, 100 c.c. of each filtrate being evaporated and dried 3 hours in the water oven. The following percentages of extract were yielded at three different temperatures:

	Temperature (approximate)		
Strength	28°C.	15°C.	10°C.
1.0 w/v	35.9	39.1	39.0
0.5 w/v	40.2	40.0	—

A proportion of 0.5 gm. per 100 c.c. at laboratory temperature appeared to be the most satisfactory, and this was adopted, twelve samples yielding from 37.1 per cent. to 47.4 per cent. Rhubarb quickly yields up its soluble matter to water, a sample shaken continuously for one minute with water giving on filtration practically the same result as one shaken occasionally during a day.

A limit of 6.0 per cent. ash is very liberal for Jamaica ginger. The original text of the 1914 B.P. required not more than 1.5 per cent. of ash *insoluble* in water, this being corrected in reprints to at least 1.5 per cent. to be *soluble* in water. At the 1896 Conference, Liverseege pointed out that the amount of ash soluble in water depended on the method used. It was recommended that the ash from 5 gms. should be boiled gently with 100 c.c. of water for five minutes, filtered with only slight further washing, and the residue ignited and weighed.

By heating the ash insoluble in water with about 10 c.c. of hydrochloric acid in a covered dish on the water bath for about 10 minutes, filtering, and igniting the residue, the ash insoluble in acid is obtained.

The amount soluble in cold water and in methylated spirit is determined in 2 per cent. (w/v) solution by maceration for about 40 hours in a closed flask with occasional shaking. Convenient quantities are 1.4 gms. of the drug with 70 c.c. of the solvent, 50 c.c. of the filtrate being evaporated and dried in the water oven for two hours.

The B.P. 5 per cent. (w/v) mixture with water and 24 hours' treatment gives practically the same result as a 2 per cent. (w/v) mixture with 40 hours, first samples of ginger yielding an average of 17.5 per cent. of extract in 40 hours, and 16.1 per cent. when the treatment was reduced to one minute. With 90 per cent. alcohol, however, lower results were obtained with the shorter time and the smaller proportion of spirit. The mean for three samples of Jamaica ginger being 7.3 per cent., with 2 per cent. (w/v) for 40 hours, 6.3 per cent. with 2 per cent. (w/v) for 24 hours, and 5.3 per cent. with 5 per cent. (w/v) for 24 hours. Following the Pharmacopœia directions gives, therefore, only a part of the matter soluble in 90 per cent. alcohol.

In the first table on p. 242 the methylated spirit extractive and the 90 per cent. alcoholic extract were determined on 2 per cent. (w/v) mixtures, with 40 hours' treatment. Other figures were obtained in the same way as with rhubarb.

The first three samples were bought from wholesale drug houses, and the next nine were bought as ginger from retail pharmacists. The pharmaceutical samples show the absurdity of the B.P. requiring at least 1.5 per cent. to be soluble in water as the *lowest* figure is 2.28 per cent. The water extract of the three samples of Jamaica ginger varied from 17.1 per cent. to 18.2 per cent., while the B.P. requires at least 8.5 per cent. The other samples were bought from grocer's or huckster's shops. Two of them had been adulterated with spent ginger, and two others with chalk and sand, the carbonated ash of these latter being 8.9 per cent. and 17.2 per cent. respectively. The chalk can be determined by boiling 2 gms. of the ginger with 50 c.c. of water, and 5 c.c. semi-normal hydrochloric acid. The solution is then titrated with semi-normal sodium hydroxide, methyl red being used as indicator. The colour is better seen after settling.

Percentage composition of rhubarb

Number of sample	Ash	Loss in water oven	Organic matter	Organic matter × 1.19	Acetic acid insoluble	Water extract	Methylated spirit extract	Carbonated ash	Wholesale or retail	Label
1	11.2	7.5	81.3	96.7	50.1	41.7	38.9	13.0	W	Opt.
2	10.3	8.1	81.6	97.1	52.9	39.2	34.1	12.5	W	E.I. No. 1
3	10.8	8.5	80.7	96.0	53.0	38.9	33.8	12.2	W	E.I. No. 3
4	13.4	6.3	80.3	95.6	54.3	37.6	38.9	15.2	W	Opt.
5	12.4	5.6	82.0	97.6	57.2	37.5	39.8	14.5	W	E.I.
6	9.0	6.2	84.8	100.9	46.3	47.4	42.0	10.4	W	E.I. B.P.
7	7.7	6.4	85.9	101.5	46.2	40.7	42.6	8.5	R	
8	10.5	5.7	83.8	98.9	50.0	42.4	38.4	12.0	R	
9	8.0	6.1	85.9	101.5	47.4	42.2	38.8	9.3	R	
10	9.7	6.1	84.2	99.3	52.2	40.7	36.0	11.4	R	
11	12.0	6.5	81.5	96.2	54.2	37.1	35.6	13.1	R	
12	11.4	6.8	81.8	97.3	53.1	39.9	36.1	12.1	R	Mixture of 5

Ginger.—The B.P. description indicates Jamaica ginger, and probably Jamaica only, but it would be better if any doubt on the matter was removed in the next Pharmacopœia.

The last line gives the average composition of samples bought as ginger under the Sale of Food and Drugs Acts which were not obviously adulterated. The ash figures and the water extract are from 339 samples. The figure

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for methylated spirit extractive is the average of 157 samples, and that for 90 per cent. alcohol extract on 198 samples.

Percentage Composition of Ground Ginger

Number of sample	Ash soluble in water	Ash (insoluble in water), soluble in HCl	Ash insoluble in HCl	Total ash	Loss in water oven	Organic matter	Organic matter 1.19	Acetic acid insoluble	Water extract	Methylated spirit extract	Alcohol (90%) extract	Label
1 ..	2.60	1.10	0.18	3.88	10.4	85.7	102.0	78.0	18.0	5.2	7.3	"Jam. Opt. B.P."
2 ..	2.76	0.86	0.26	3.88	9.0	87.1	103.6	80.1	18.2	5.5	7.0	"Jam."
3 ..	2.56	0.88	0.26	3.70	9.3	87.0	103.5	78.3	17.1	5.0	7.6	"Jam. B.P."
4 ..	2.44	0.66	0.04	3.14	10.1	86.8	103.3	—	16.8	4.3	6.0	Pharmacist
5 ..	2.28	0.78	0.08	3.14	10.4	86.5	103.0	—	16.6	4.6	6.9	,,
6 ..	2.48	1.98	0.32	4.78	10.8	84.4	100.4	—	12.8	5.1	7.1	,,
7 ..	2.78	0.74	0.12	3.64	10.1	86.3	102.7	—	16.3	4.8	7.1	,,
8 ..	2.56	2.48	0.67	5.65	10.6	83.8	99.8	77.8	13.4	6.2	—	,,
9 ..	2.89	2.68	0.39	5.96	10.6	83.4	99.1	77.3	12.9	5.2	—	,,
10 ..	2.35	2.88	0.73	5.96	10.8	83.2	99.0	78.1	11.8	5.8	—	,,
11 ..	2.40	2.43	0.39	5.22	10.9	83.9	99.9	77.9	13.5	6.0	—	,,
12 ..	2.46	2.40	0.48	5.34	10.7	84.0	100.0	76.4	12.3	6.3	—	,,
13 ..	2.37	2.53	1.01	5.91	9.2	84.9	101.1	80.4	13.3	—	6.5	
14 ..	2.63	2.41	0.70	5.74	9.8	84.5	100.3	77.6	15.2	—	6.5	
15 ..	2.51	3.21	0.76	6.48	9.5	84.0	100.0	78.1	13.2	—	6.7	
16 ..	2.33	2.24	0.29	4.88	9.8	85.3	101.5	80.0	15.1	—	5.1	
17 ..	—	—	0.64	6.22	10.6	83.2	99.0	76.0	11.8	5.1	—	
18 ..	—	—	0.92	6.14	9.8	84.1	100.1	79.6	12.6	5.7	—	
19 ..	—	—	0.26	5.24	10.3	84.5	100.3	77.2	14.0	5.7	—	
20 ..	—	—	0.58	6.34	10.9	82.8	98.5	76.2	12.6	5.0	—	
21 ..	—	—	1.02	6.46	9.9	83.6	99.6	76.0	12.8	5.5	—	
22 ..	2.60	3.2	0.80	6.60	9.1	84.3	100.1	78.4	12.6	7.1	—	
23 ..	2.42	1.30	0.40	4.12	10.6	85.3	101.5	—	16.2	5.3	—	
24 ..	2.00	1.96	0.32	4.28	10.0	85.7	102.0	—	16.1	5.1	—	
25 ..	1.80	0.86	0.34	3.00	11.2	85.8	102.1	—	6.6	—	5.5	Spent ginger
26 ..	1.52	0.88	0.28	2.68	11.1	86.2	102.3	—	7.1	—	5.0	,, ,,
27 ..	2.20	12.16	1.38	15.74	11.7	72.6	86.5	—	12.6	—	5.9	,, Chalk and sand
28 ..	2.12	4.28	1.24	7.64	9.9	82.5	98.2	—	12.7	4.4	—	,, ,,
29 ..	2.68	1.65	0.50	4.83	10.0	85.2	100.2	79.0	13.9	5.0	5.3	Mixture of 6
30 ..	2.52	2.16	0.58	5.26	11.0	83.7	99.7	—	12.8	5.9	6.4	Average

Magnesia and Carbonate of Magnesia. — Light and heavy carbonates are required by the B.P. to give 42 to 44 per cent. of ash. The B.P.C. states that light carbonate of magnesia has the approximate composition of $3\,MgCO_3$, $Mg(OH)_2$, $3H_2O$, indicating 44.1 per cent. of ash and 36.1 per cent. of CO_2. The heavy carbonate is stated to contain $4\,H_2O$, the corresponding figures being 42.0 per cent. and 34.4 per cent. respectively.

Calcined magnesias that had been kept lost weight on drying in a water oven, but the weight of freshly-prepared samples increased. The formation of magnesium hydroxide apparently requires time. A sample of magnesia, wetted and then dried in a water oven, gained 39.1 per cent., and after drying at 150° C. the increase was 38.5 per cent. Magnesia, after exposure, contains moisture in three forms, one of which is lost in the water oven and the other two on ignition.

Light carbonate of magnesia is practically unaltered in weight by wetting and drying in the water oven, or by exposure (when wet) to carbon dioxide. If the theoretical percentage of CO_2 in light carbonate of magnesia containing $3H_2O$ be multiplied by 1.55 the percentage lost on ignition should be obtained. In the following table the percentage of carbon dioxide is given, and also that figure multiplied by 0.55, which gives "combined" water. If these are added to the percentage of ash, and "moisture" lost on drying in a water oven, the sum should approximate to 100 if the sample is a mixture of magnesia and light carbonate of magnesia. Examination of the figures in the sixth column shows a reasonable approximation to this figure in most cases, indicating that magnesia on keeping tends to become light carbonate. The lowness of

Analyses of Magnesia and Carbonate of Magnesia.

Number of sample	Ash	Loss in water oven	CO_2	CO_2 × 0.55	Total	Gain in water oven	SO_4	$Fe_2O_3 + Al_2O_3$	Lead per million	Arsenic per million	Specific gravity	Wholesale or retail	Label
1 ..	97.8	—	0.6	0.3	98.7	0.4	0.68	0.54	—	—	—	W	Light magnesia
2 ..	97.9	—	—	—	—	0.5	0.62	0.28	—	0	0.14	W	,, ,,
3 ..	98.6	—	0.6	0.3	99.5	0.4	0.58	0.23	—	2	0.13	W	,, ,,
4 ..	98.5	—	0.3	0.2	98.8	0.4	0.64	0.19	—	4	0.15	W	,, ,,
5 ..	96.5	0.1	2.0	1.1	99.7	—	0.81	0.35	5	1	0.10	W	,, ,,
6 ..	98.6	—	0.5	0.3	99.4	0.7	—	—	—	—	0.09	W	,, ,,
7 ..	99.0	—	0.5	0.3	99.8	1.0	—	—	—	—	0.09	W	,, ,,
8 ..	99.2	—	0.5	0.3	100.0	0.5	—	—	—	—	0.08	W	,, ,,
9 ..	99.3	—	0.4	0.2	99.9	0.4	—	—	—	—	0.09	W	,, ,,
10 ..	98.8	—	1.0	0.5	100.1	0.3	—	—	—	—	0.08	W	,, ,,
11 ..	98.5	—	0.9	0.5	99.9	0.2	—	—	—	—	0.09	W	,, ,,
12 ..	93.6	0.7	2.9	1.6	98.8	—	—	—	—	—	—	R	,, ,,
13 ..	92.7	0.3	1.6	0.9	95.5	—	—	—	—	—	0.12	R	Magnesia ,,
14 ..	69.7	4.3	15.0	8.3	97.3	—	—	—	4	1	0.13	R	Calcined magnesia
15 ..	68.8	2.2	12.7	7.0	90.7	—	—	—	8	2	0.14	R	,, ,,
16 ..	97.0	—	1.2	0.7	98.9	0.2	—	0.42	16	1	0.13	R	,, ,,
17 ..	96.8	—	1.3	0.7	98.7	0.1	—	—	16	0	0.12	R	Light calcined magnesia
18 ..	88.9	1.2	4.9	2.7	97.7	—	—	—	12	0	0.15	R	,, ,,
19 ..	98.5	—	0.5	0.3	99.3	0.4	—	0.23	8	0	0.14	R	Magnesia ,,
20 ..	93.9	—	2.3	1.2	97.4	0.1	—	—	—	—	0.39	W	Heavy magnesia
21 ..	98.7	0.2	0.5	0.3	99.7	—	1.49	0.36	20	1	0.36	W	,, ,,
22 ..	43.0	1.3	35.3	19.4	99.0	—	—	—	12	0	0.43	R	Calcined magnesia
23 ..	44.0	1.8	35.4	17.7	98.9	—	0.23	—	—	—	0.09	W	Light carbonate
24 ..	44.7	1.4	36.2	19.9	102.2	—	—	—	8	0	0.09	R	Carbonate
25 ..	43.1	1.7	35.5	19.5	99.8	—	—	—	4	1	0.10	R	,,
26 ..	43.6	1.5	36.0	19.8	100.9	—	—	—	4	1	0.09	R	,,
27 ..	44.2	1.0	35.7	19.6	100.5	—	—	—	20	0	0.10	R	,,
28 ..	43.7	1.0	34.7	19.1	98.5	—	—	—	12	0	0.10	R	Magnesia
29 ..	42.2	2.8	34.6	19.0	99.4	—	0.43	—	—	—	0.47	W	Heavy carbonate

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the total in other examples suggests that more magnesium hydroxide was present than the theory indicates. The specific gravity of the sample of magnesia was obtained by crushing it with a spatula when necessary and putting 20 c.c. of the powder into a cylinder about 18 mm. in diameter. The cylinder was not shaken except to level the surface at the finish. Fairly consistent duplication could be obtained in this way.

Nearly all the above samples were analysed in 1925, the retail samples being bought under the Sale of Food and Drugs Acts. The inferior quality of No. 14 was due to the fact that it had been packed in a cardboard box without any attempt to exclude air. No. 22, though sold as calcined magnesia, was heavy carbonate. For some of the wholesale samples the authors are indebted to the Washington Chemical Company. Examination of the figures shows that the B.P. requirement of 99 per cent. residue on ignition is unduly stringent; 98 per cent. appears to be more reasonable for wholesale samples; after allowing for deterioration, retail samples should give at least 95 per cent. of ash. For light carbonate of magnesia an allowance of 2 per cent. loss in water oven, and of 35.4 per cent. of CO_2 on ignition, appears reasonable; therefore:—

$$\text{Percentage of carbonate} = \frac{\% \ CO_2 \times 100}{35.4}, \quad \text{or}$$

$2.8 \times \% \ CO_2$.

Five samples of magnesia and two samples of carbonate were shaken with water and filtered immediately afterwards. The PH values of the filtrates were all practically alike, varying only from 10.0 to 11.2. A number of determinations of solubility were made by shaking the powder with water, filtering, evaporating 100 c.c., and drying in the water oven. In these conditions light magnesias Nos. 1, 2, 3, 4 yielded 11 to 16 mgms., while No. 11 gave 48 mgms. and No. 10 gave 56 mgms. There was no appreciable difference in the figure whether the time of treatment was 1 minute or 1 day. Heavy magnesia No. 21 gave 27 mgms., and light carbonate No. 23 gave 16 mgms.

Effect of Magnesia on Water Extract of Rhubarb and Ginger.—Elsdon and Hawley, in a paper at the 1915 Conference, recommended determination of water-soluble extractive of Gregory's powder as a means of determining its content of rhubarb and ginger. The water extract was obtained by treating 1.2 gm. with 60 c.c. of cold water for 12 hours, filtering and evaporating 50 c.c. with subsequent drying to constant weight. Gregory's powder samples bought during eleven years and others prepared in the laboratory gave 12 per cent. extractive by this method, but last year three samples bought at the same time and analysed together gave 7.3 per cent., 9.4 per cent., and 11.8 per cent. of water extract, figures suggesting that two were incorrectly prepared; but Gregory's powder prepared from the drugs used for the two low samples gave similar results, showing that under certain conditions the method was unsatisfactory. Experiments showed that with 0.5 gm. of rhubarb extracted with 150 c.c. of water, the residue yielded by 100 c.c. of the clear filtrate increased (from 216 mgms.) when magnesia was absent (to 226 and 232 mgms.) when 50 and 100 mgms. of magnesia were present (the solubility of magnesia in 100 c.c. water being about 12 mgms.), and any further increase in magnesia leads to falling off in extractive. A like reduction was produced by the action of the same magnesia on different rhubarbs, whilst carbonated magnesias gave higher figures. Three different light magnesias gave extracts (153, 167, and 220 mgms.) lower than that (268 mgms.) without magnesia. The low results both for ginger and rhubarb might be explained either by magnesia interfering with the solvent power of water upon the drug or by precipitation occurring after solution, and tests showed the latter took place both with standing and shaking. It was also proved that this precipitation is not due to oxidation or presence of fine powder (kieselguhr and kaolin being inert), or impurities (CaO, Al_2O_3, Fe_2O_3, and SO_4 being tried). Magnesia reduced the amount of extractive (about 400 to 440 without magnesia) in 1 per cent. solution dextrin (86), acacia gum (58), soluble starch tannin (393), by the figures in parentheses, which r to milligrams. Carbon dioxide in the water was ruled out by testing. However, igniting magn resulted in products with increased precipitating a (except in the case of one specimen of light magne whilst heavy magnesias and carbonates of magnesia became active after ignition. Six examples of light magnesia gave water extractive varying from to 199 mgms., in a sample of rhubarb, which wit magnesia yielded 188 mgms. Apparently it is not pos to regulate the heat during manufacture so that diffe batches of magnesia have exactly the same treatm and this fact appears to be the explanation of the di ence in the action of different magnesias on the rhu and ginger in Gregory's powder. Other experim confirmed that the nature of the ignition magnesia affected the amount of extract. A interesting feature is the fact that of two sam of light magnesia, with apparently identical composit one may be practically inactive as far as its powe "precipitating" the water-soluble constituents rhubarb and ginger is concerned, while the other be intensely active. This suggests that the phenom is essentially (though perhaps not entirely) a phy one, consisting not of chemical precipitation but adsorption at the surface of the particles of magn It seems quite likely that the adsorptive power of surface of a magnesia particle is influenced to s extent by its previous history (i.e., ignition). I also possible that the activity of light magnesia ma reduced by the formation of a layer of carbonat hydroxide (or both) on the outer surface of the part in too small amounts as to be detected by chem methods, the percentage of CO_2 in a magnesia par (containing millions of molecules), with its outer l converted into carbonate several molecules depth, w be infinitesimal. Deci-normal ammonia instead of w did not improve water extraction of Gregory's pow Much better results were obtained with the use of normal ammonium carbonate, but owing to its sol power on magnesia it was necessary to correct the we of the extract obtained by subtracting "carbonat ash. Experiments showed that the precipitation du magnesia may commence after two days or before hour has passed, but it was also found that one mi figures give good results for water extract with Greg powder. As shown above, one minute is a suffi time to extract the soluble matter of rhubarb (in w/v mixture), but the results for ginger are about 1 cent. low. Samples of Gregory's powder made with t different magnesias yielded 126, 129 and 138 mgm., extract due to rhubarb and ginger alone being 127 n

Theoretical Composition of Gregory's Powder. — figures in the table below are probably reasonable for the constituents of Gregory's powder. From t has been calculated the composition of Gregory's po properly prepared with light magnesia, and also incorrectly prepared with light carbonate.

Composition of Gregory's Powder

—	Ash	Loss in water oven	CO_2	Organic matter & combined water	Water extract	A a so
Rhubarb	10	7	0	83	40	
Ginger	5	10	0	85	16	
Light magnesia ..	98	1	1	0	—	
Light carbonate ..	44	2	35	19	—	
Gregory's powder B.P.	87.5	3.4	0.7	28.4	10.7*	
Gregory's powder prepared with magnes. carb. levis ..	31.8	4.1	23.1	41.0	10.7*	

* Without magnesia.

Analysis of Gregory's Powder.— *Ash* is determine 1 gm., it being advisable before ignition to wet light magnesia with spirit in order to prevent part being blown away. There is also a like risk in determi moisture in a water oven. Amount of *Carbonate* is d

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ed by boiling about 3 gm. with dilute sulphuric acid absorbing the CO_2 in a Geissler potash bulb. *Water ract* is obtained by adding 150 c.c. of water to 1.5 of the powder, shaking continuously for one minute, throwing the whole on to a dry filter (18½ cm., 595), returning the first few c.c. Of the clear filtrate c.c. is evaporated in a flat-bottomed metal dish and ghed after drying in a water oven for three hours. *tic acid insoluble matter* is determined as for rhubarb ginger on 1 gm. of sample. A difficulty in the lysis of Gregory's powder is in the fact that all the er is not given off in the water oven, but drying at ıer temperatures proved to be of no use, as shown the following results on separate ingredients dried essively at increasing temperature. It will be observed t light magnesia continued to gain, light carbonate very little more, but rhubarb and ginger showed ıs of decomposition.

Effect of Drying at Different Temperatures

—	%	Water oven	115–120°C.	150° C.
t magnesia ..	Gain	0.45	0.65	0.55
t carbonate ..	Loss	1.7	1.9	2.3
barb	Loss	7.75	8.6	9.95
ger	Loss	10.8	11.6	12.7

n previous tables percentage of CO_2 × 0.35 gave an roximation of combined water, and organic matter 1.19 gave approximate amount of rhubarb and ginger sent, and in the table below a combination of these facts gives the sum of the percentages of rhubarb ginger in various Gregory's powders. Elsdon and wley multiply the sum of the water extract and the ic acid insoluble by 1.1 to obtain the percentage of barb and ginger, but this factor is too high, 1.05 ıg a better, as it shows reasonable agreement with ılts obtained by computation from organic matter.

he percentage of carbonate in Gregory's powder may obtained (A) by multiplying the percentage of CO_2 2.8, as shown under magnesia or from the ash by ormula (B) :—

$$\text{Percentage of carbonate} = \frac{(67.5 - a) \times (100 - b)}{35.7}$$

re, a = per cent. of ash and b = per cent. of rhubarb and ger.

he results obtained by the two methods did not show h difference (see table below).

amples A to H were prepared in the laboratory from different samples of rhubarb, two different samples ginger, and six different samples of magnesia. A made with heavy magnesia and D with light carate, while F and G had the proportions of rhubarb ginger transposed. The rest were commercial ples, L having deteriorated by keeping. There is ıe evidence that, on keeping, part of the moisture the rhubarb and ginger is "fixed" by the magnesia, so that it is not lost in the water oven. A properly prepared Gregory's powder should yield about 12 per cent. of water extract in one minute. Some samples which gave low water extract in two days showed an increase in this figure on keeping, but the one-minute figures were practically constant. The table includes samples which were made in 1902 and 1914, and which were kept in corked bottles, and even after so many years the analytical results are satisfactory.

The Colour of Compound Tincture of Cardamoms

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[Abstract]

Charges of inaccurate dispensing are alleged to have arisen from variation in colour of compound tincture of cardamoms, and this communication concerns an investigation into the nature and the relative importance of the factors producing such variation. The colour of tinct. card. co. is due mainly to cochineal, which is an "indicator" showing a purplish-violet colour in alkaline solution and a relatively much weaker orange colour in acid solution. In making colour comparisons the hydrogen-ion concentration or Ph value of diluted tinctures must be adjusted by the addition of a buffer salt, sodium phosphate (Na_2HPO_4) being used throughout to bring about Ph 9, the colours of the dilutions being compared in Nessler tubes. Taking one tincture as an arbitrary standard of 100, other colour strengths are inversely proportional to the thickness of liquid required to match this colour standard when white light is transmitted through both.

Variation in Colour Strength.—A comparison of a number of samples of tinct. card. co. obtained from various sources gave the following results :—

Number of Sample	Relative colour strength (with Na_2HPO_4)	Ph of tincture
1	108	5.0
2	100	5.4
3	85	5.0
4	81	4.6
5	81	4.8
6	76	4.9
7	74	5.2
8	70	4.8
9	68	4.6
10	63	4.8
11	37	5.2

The Ph values were obtained by comparing the colour of the tincture, diluted with water, with that of the same tincture diluted with a buffer solution of known Ph value. Strictly the values are only comparative, and represent Ph values not of the original tinctures, but of tinctures diluted with four parts of water.

Percentage Composition of Gregory's Powder

gnation sample	Ash	Loss in water oven	CO_2	CO_2 × 0.55	Organic matter	Acetic acid insoluble	Water extract	Organic matter 1.19	1.05 (acetic acid insoluble + water extract)	CO_2 × 2.8 (A)	Equation (B)	
.. ..	65.3	2.6	1.7	0.9	29.5	20.3	12.5	35.1	34.4	5	4	Heavy
.. ..	62.7	4.2	2.3	1.3	29.5	22.0	12.0	35.1	35.7	6	9	
.. ..	63.0	3.1	2.4	1.3	30.2	20.2	12.0	35.9	33.8	7	8	
.. ..	32.3	3.9	23.3	12.8	27.7	20.2	11.5	33.1	33.3	65	66	Light carbonate
.. ..	66.9	2.5	0.4	0.2	30.0	21.3	12.5	35.7	35.5	1	1	
.. ..	66.7	3.0	0.3	0.2	29.8	24.3	9.4	35.5	35.4	1	1	Rhubarb 12%
.. ..	67.6	2.8	0.3	0.2	29.1	24.2	10.3	34.6	35.8	1	0	Ginger 22%
.. ..	67.6	2.6	0.6	0.3	28.9	20.7	11.2	34.4	33.5	2	0	
.. ..	66.2	1.7	2.1	1.2	28.8	20.2	12.6	34.3	34.3	6	2	Made 1902
.. ..	64.5	2.9	2.5	1.4	28.7	19.4	12.5	34.2	33.5	7	6	Made 1902
.. ..	65.1	3.0	1.9	1.0	29.0	19.4	14.0	34.5	35.1	5	4	Made 1914
.. ..	47.6	4.5	12.1	6.7	29.1	20.2	12.5	34.6	34.3	34	36	Deteriorated
.. ..	61.8	4.8	4.7	2.6	26.1	19.5	13.1	31.1	34.2	13	11	
.. ..	61.1	3.9	3.7	2.1	29.2	21.0	11.8	34.8	34.4	10	12	
.. ..	67.8	2.6	1.1	0.6	27.9	20 3	12.6	33.2	34.5	3	—	Same maker
.. ..	68.7	2.1	0.9	0.5	27.8	20.3	12.2	34.1	32.5	2	0	
.. ..	67.3	1.8	1.1	0.6	29.2	20.2	13.0	35.7	34.9	3	0	Same maker
.. ..	69.0	3.0	1.1	0.6	26.3	20.5	11,7	31.3	33.8	3	0	

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Effect of Pʜ on Colour.—In the accompanying curve it will be seen that from Pʜ 4 to Pʜ 6 the intensity of cochineal colour increases rapidly, and as commercial samples of the compound tincture of cardamoms come within this range their colour is very sensitive to changes in hydrogen-ion concentration (see Fig. 1).

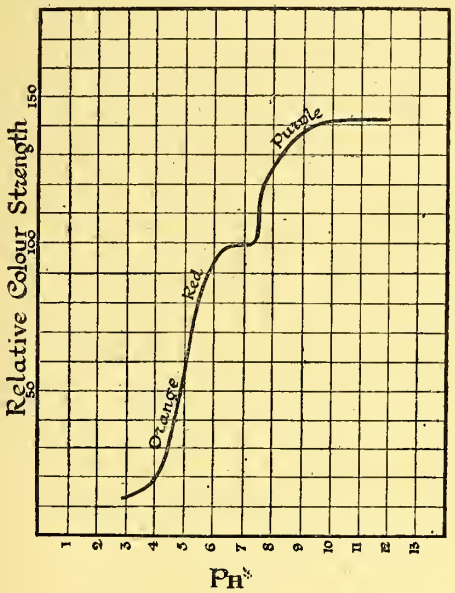

Fig. 1

Variation in Cochineal.—Chemical assay of cochineal by oxidation of carminic acid is not satisfactory, but a colorimetric comparison by the Bentley and Meakin method (communicated at the 1925 Conference) is better. Samples of cochineal from different sources were compared by making simple tinctures by percolation and comparing their colours compared both with and without the addition of a buffer salt.

No. of sample	Kind	Pʜ of tincture	Relative colour strength	
			In water	With Na_2HPO
1	Silver grain ..	4.5	81	81
2	,, ,, ..	4.5	79	94
3	,, ,, ..	4.8	118	91
4	,, ,, ..	4.9	122	91
5	,, ,, ..	4.8	106	85
6	,, ,, ..	4.8	100	97
7	,, ,, ..	4.6	70	89
8	,, ,, ..	5.0	89	89
9	,, ,, ..	5.0	100	100
		Mean	Mean	Mean
		4.76	96	91
10	Dark grain ..	4.5	67	89
11	,, ,, ..	4.4	63	82
12	,, ,, ..	4.6	94	94
13	,, ,, ..	4.4	72	85
14	,, ,, ..	4.4	67	85
15	,, ,, ..	4.4	67	89
16	,, ,, ..	4.4	65	87
17	,, ,, ..	4.2	53	87
		Mean	Mean	Mean
		4.41	69	87

Dark grain cochineal gives a slightly more acid tincture than the silver grain, this difference being reflected in its weaker colour on dilution with water. The true colour differences after the addition of sodium phosphate buffer are much less, being only about 5 per cent. in favour of the silver grain variety of cochineal. The difference between the best and the worst sample of cochineal is about 20 per cent.

Effect of Contact with Metals.—A trace of a salt produces no appreciable effect on colour of ture, but the colour becomes much bluer with a trac ferrous salt, and colour precipitation occurs in a solutions. This would explain why traces of iron normally present in the finished ingredien tinct. card. co. do not affect the colour, whereas derived from metallic contact makes its colour and duller. The colour of a cochineal solution is destroyed by the reducing action of metallic zi an acid; and the influence of zinc and iron up colour of tinct. card. co. was compared by makin batches of tincture in glass vessels, after the ad of metallic zinc or iron in powder to the powdered The percolation process occupied about thirty hour 5 gm. of powdered metal were added for every 2 of tincture. The relative colour strengths of these mental tinctures were determined with and witho addition of sodium phosphate, and the colours we measured in the Lovibond tintometer (1 in 30 di ½-inch cell). Owing to the large surface of exposed, the conditions were obviously much more than would arise through making a tincture in vanised iron percolator. The figures in the foll table indicate that both zinc and iron have a very n effect upon the colour of the tincture.

Added before percolation	Buffer added	Relative strength	Nature of colour	Tintome	
				Black	Oran
No addition	Nil ..	100	red	0	1.3
	Na_2HPO_4	78	red	0.2	0.1
Zinc dust ..	Nil ..	57	orange	0	1.1
	Na_2HPO_4	50	orange-red	0	1.5
Iron filings	Nil ..	50	(dirty)	0.3	0.5
and zinc dust	Na_2HPO_4	40	orange-red (dirty)	0.2	0.9
Iron filings	Nil ..	very weak	dirty grey-ish	0.3	0.1
	Na_2HPO_4	53	dirty grey-ish	0.3	0.3

Similar experiments with metallic tin produc diminution in colour; a slight apparent increase oc owing to reduction in acidity. With powdered co percolate extremely weak in colour was obtained it was found subsequently that copper sulphate s almost completely precipitated the colouring mat tinct. card co. It may accordingly be concluded though galvanised iron percolators are not ideal, these are used care should be taken to keep them galvanised, and the time of percolation should prolonged more than necessary. Well-tinned copp colators are quite suitable.

Deterioration of the Tincture.—Four samples of card. co. tested by tintometer, after standing in glass bottles for six months in a cool, shady gave results in every case identical with those re six months previously. These solutions were all and those diluted with distilled water showed a loss of colour in storage, owing to a slight incre acidity. Therefore the tincture undergoes no det tion in colour when stored under proper conditions reasonable period.

Loss of Colour in Mixtures Containing Tinct. Co.—With mixtures containing tinct. card. co. insoluble basic substances (such as bismuth oxycarb magnesium carbonate, etc.), the colour is more completely removed, especially when a precipit produced. This is the cause of the partial decolor of mixtures containing carbonates when made up tap water, and it is possible to decolorise comple mixture containing tinct. card. co. and spt. a aromat. by the addition of calcium chloride. In a mixtures destraction of the colouring matter of co by oxidation (including atmospheric oxygen) pr the more quickly, the more alkaline the solutio only very slowly (if at all) in solutions on th side of neutrality. The colour does not appear to on the addition of reducing agents. Aeration

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ments showed that tinct. card. co. is fairly rapidly decolorised in presence of air at a PH above 8, but slowly (if at all) below PH 7. It follows that mixtures containing an alkali (e.g., sodium bicarbonate, ammonium bicarbonate, or aromatic spirit of ammonia) should be made with boiled water and kept in well-filled bottles. Such statements that tinct. card. co. is compatible with potassium or ammonium bromide, but not with sodium bromide, are not valid unless drawn from experiments in which both PH value and amount of available air are controlled.

Comparison of Different Formulas.—Tinctures were made according to three different formulas: (1) B.P. 1914, (2) B.P. 1898, and (3) that of Hill and Umney, using 60 per cent. alcohol, and reducing the proportion of glycerin to 1 in 10. The same cochineal was used in each case, the following results being obtained :—

Sample of cochineal	Formula	PH	Relative colour strength	
			In water	With Na_2HPO_4
1	B.P. 1898 ..	4.5	41	58
	B.P. 1914 ..	5.0	100	100
	Hill & Umney ..	4.8	139	125
3	B.P. 1898 ..	4.4	61	100
	B.P. 1914 ..	5.0	117	124
	Hill & Umney ..	4.6	127	141
10	B.P. 1898 ..	4.4	77	118
	B.P. 1914 ..	4.9	104	128
	Hill & Umney ..	4.8	96	135

The greater colorimetric strength of the Hill and Umney tincture is presumably due to the superior solvent action of 60 per cent. alcohol. The B.P. 1898 formula contains slightly less cochineal than the B.P. 1914 formula, but the difference is not great enough to account for the variation in colour which was observed. Possibly part of the colour is precipitated by the traces of iron in the raisins. The authors conclude that their experiments indicate that in order to produce a tincture with a colour as uniform as possible a buffer salt should be added to give a constant hydrogen-ion concentration between PH 6.6 and PH 7.4, a value of PH 7 being desirable. Bentley and Meakin's recommendation to add sodium acetate to tincture of cochineal, corresponds to a PH value of 5. The addition of a buffer to compound tincture of cardamoms might be put forward for inclusion in the next British Pharmacopœia, and the substitution of 60 per cent. alcohol for the 45 per cent. alcohol of the present formula might also be recommended.

The above work has been carried out in the pharmaceutical research laboratory of The British Drug Houses, Ltd. Indebtedness is expressed to a number of manufacturing druggists for suggestions and samples.

The Search for Colour Reactions of Vitamin "A"

By T. TUSTING COCKING, F.I.C., and ERNEST A. PRICE

[ABSTRACT]

THE violet coloration given by liver oils with sulphuric acid was included in the official characteristics of cod-liver oil in the British Pharmacopœias of 1867, 1885, and 1898, and is still official in modified forms in many foreign pharmacopœias. By the irony of fate this test was removed from the British Pharmacopœia of 1914 just after the discovery of vitamins by Professor Gowland Hopkins in 1912. Drummond and his co-workers suggest a close parallelism between growth-promoting vitamin A and the chromogenic substance, but definite confirmation that these colour reactions are truly indicative of vitamin A is not yet available. Attempts have been made to make the test delicate by carrying it out in solution (in carbon disulphide, carbon tetrachloride, benzene, chloroform or petroleum ether). Sulphuric acid has also the disadvantage that the characteristic colour is evanescent and liable to be marked by charring. The use of arsenic trichloride, proposed by Rosenheim and Drummond, marked a great advance. This reagent produces a brilliant blue colour, but it is unpleasant and dangerous in use, and cannot be applied to solutions. These workers also recommended a saturated solution of trichloracetic acid in chloroform, this test being roughly quantitative if the violet colour produced is compared with that of standard solutions containing methylene blue and methyl violet. Tests in the B.D.H. laboratories showed that the coloration depends upon impurities in commercial trichloracetic acid, the pure acid giving no reaction. Among the other reagents tried, antimony trichloride dissolved in chloroform was found to be more advantageous than any other, its use being described to the Biochemical Society on March 13 by F. H. Carr and E. A. Price (see *C. & D.*, 1926, I, p. 443). Further experience gained in the carrying out of the test is now put on record in the hope that they will be useful to others. The blue colour appears to be proportional to the vitamin content, but to make a perfect colour match it is necessary to analyse this colour into blue, red and yellow, for which purpose the Lovibond tintometer appears to be by far the most suitable means of giving a numerical value to each of the primary colours. This instrument consists of a narrow box with an eyepiece at one end and two parallel slots at the other, one slot taking the glass cell containing the test liquid and the other being used for the standard strips of coloured glasses, these consisting of strips of blue, red and yellow glass varying in intensity according to the numerical value marked thereon. The colours are so standardised that equal values of blue and red produce violet; blue and yellow, green; and red and yellow, orange; while equal values of all three colours give neutral or black colour.

The Antimony Trichloride Test for Vitamin A.—The reagent is prepared by dissolving 30 gm. of pure antimony trichloride (previously washed with a little chloroform) in sufficient chloroform to produce 100 c.c. A 20 per cent. solution (by volume) of the oil in chloroform is prepared. Of this 0.2 c.c. (equivalent to 0.04 c.c. of oil) is measured from a 1 c.c. burette into a small dry test tube and 2 c.c. of the reagent (also measured from a burette) is added. The mixed liquids are transferred immediately to a flat cell with glass sides (8 mm. apart being used by the authors). The colour is then matched by means of the standard coloured glasses, at least three separate observations being carried out on each sample of oil. An average is then taken of the results recorded numerically (in terms of blue, red and yellow). Statements that the refined pale medicinal oils are not so active as the red and brown cattle oils are not borne out by colour tests with antimony trichloride reagent, and for comparative purposes the natural colours of the oils are also recorded in Lovibond tintometer units. With dark oils the blue colour is appreciably affected by the yellow or red shades of the original colour, and where this occurs the test values recorded have been corrected for the inherent colour of the oils. It must be recognised, however, that the colouring matter may be affected by the reagent. With refined cod-liver oils such a correction is unnecessary, colour due to the small amount of oil used being negligible; but the correction should always be applied in testing deeply coloured oils or oils of very low vitamin content. Antimony trichloride is also particularly advantageous for testing the concentrated vitamin extracts, consisting of the unsaponifiable fraction of cod-liver oil. Such extracts, which are frequently highly coloured, are tested in dilute chloroform solutions of approximately the same vitamin strength as cod-liver oil, the degree of dilution being arrived at by trial and error. The necessary connection should be applied if the solution is highly coloured. The advantages of the antimony trichloride reagent are :-

(1) The reaction is not interfered with by traces of water or alcohol, as is the case with most other reagents (so that anhydrous or alcohol free chloroform is unnecessary).

(2) A fully saturated solution is not essential, and the reaction mixture may be diluted with chloroform without upsetting the colour. The reaction may be carried out on a solution of the oil in chloroform, which thus permits accurate measurement.

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(3) The blue colour produced is more permanent and intense than that given by any other reagent tried up to the present.

(4) The reagent, though corrosive to the skin, is relatively innocuous compared with arsenic trichloride.

(5) The reagent shows no diminution in reactivity when kept in a stoppered bottle for several months.

The following table includes figures for the original colour of the oil and the intensity of the colour developed with antimony trichloride reagent, stated in Lovibond tintometer units. The amount of unsaponifiable matter is also indicated, because vitamin A, if present, always accumulates in this portion of cod-liver oil.

Vitamin Colour Tests on Cod Liver Oils

Kind of cod-liver oil	Unsaponifiable matter	Natural colour of oil in ½ inch cell		Colour produced by 0.04 c.c. of oil in standard vitamin test in 8 mm. cell		
		Yellow	Red	Blue	Yellow	Red
NORWEGIAN:	Per cent.					
1 Pale refined	1.3	1.2	0.1	2.1	0.3	nil
2 " "	1.6	1.5	nil	7.8	1.2	nil
3 " "	1.2	1.0	nil	3.0	nil	0.4
4 " "	0.9	1.2	0.1	5.2	0.9	nil
5 " "	1.1	0.9	0.1	3.7	0.9	nil
6* " "	—	—	—	3.0	0.7	nil
7 " "	—	—	—	3.7	0.9	nil
8 " "	0.7	1.1	nil	4.1	0.9	nil
9 " "	0.88	1.1	nil	3.4	0.5	nil
10 " "	1.8	1.3	nil	4.0	0.5	0.2
11 " "	—	1.5	nil	9.5	0.4	nil
12 Pale unrefined	1.7	1.6	0.1	7.6	1.0	nil
13 " "	1.4	1.5	nil	4.9	0.6	nil
14 " "	1.5	1.2	nil	3.1	0.5	nil
15 Red medicinal	2.1	27.0	18.5	6.1	2.5	1.5
16 " "	—	23.0	21.0	4.8	2.0	1.8
17 Cattle ..	1.9	9.0	1.6	5.3	0.4	nil
NEWFOUNDLAND						
1 "	1.7	1.6	nil	5.4	0.6	nil
2 "	1.6	2.1	nil	8.0	0.5	nil
3 "	1.7	1.9	nil	10.0	1.0	nil
4* "	—	—	—	9.5	1.1	nil
5 "	—	2.1	0.1	16.1	2.0	2.0
6 "	—	—	—	5.0	0.6	nil

* Experiments in animals on these oils carried out by Dr. S. W. F. Underhill showed that No. 4 Newfoundland oil was at least three times as active as No. 6 Norwegian oil.

VITAMIN TESTS ON ANIMAL OILS

For vitamin colour tests on these oils it was necessary to take a larger quantity (0.2 c.c. instead of the usual 0.04 c.c.); the figures given should therefore be divided by five for comparison with cod-liver oils.

Kind of oil	Unsaponifiable matter (average percentage)	Natural colour of oil in ½ in. cell		Colour produced by 0.2 c.c. of oil in standard vitamin test in 8mm. cell		
		Yellow	Red	Blue	Yellow	Red
Sperm oil	40	3.5	0.9	2.5	1.0	0.5
Whale oil	2.5	3.5	1.2	4.1	2.8	0.9
Seal oil ..	1.0	5.0	1.0	8.5	10.5	7.0
Neatsfoot oil ..	0.4	0.7	nil	0.2	0.7	0.2
Lard oil ..	0.2	3.9	0.9	0.4	2.0	1.7

Conclusions to be drawn from the above results are :—

(1) The colour of the oil itself is no criterion of its vitamin content.

(2) The amount of unsaponifiable matter present is not a guide to vitamin content.

(3) Newfoundland oils examined have, on an average, a much greater vitamin activity than Norwegian oils.

(4) The vitamin activity of cod-liver oils may vary as much as 8 : 1, as judged by the antimony chloride test.

A summary, arranged alphabetically, of the reactions observed with different reagents is given below. Many of these give immediately a blue colour, which changes very rapidly to blue-violet, violet, red-violet, and finally reddish-brown, and this secondary reaction is so rapid in most cases that accurate colour matching is impossible.

Acetyl chloride (Rosenheim and Drummond) yields a blue colour in the presence of zinc chloride, but not if the latter be omitted.

Anhydrous aluminium chloride added in the form of a fine powder to the oil or its chloroformic solution produces a reddish violet colour, the colour being adsorbed by the powder, and the rate of reaction depending also upon its state of sub-division. A trace of dry hydrogen chloride or phosgene markedly accelerates the reaction and considerably increases the amount of blue colour.

Antimony trichloride (Carr and Price).—A solution in ordinary B.P. chloroform produces an intense ultramarine blue, stable for at least 3 minutes (*not affected by the addition of more chloroform.*)

Antimony pentachloride produces with a chloroform solution of cholesterol an intense blood red colour, which, on standing, forms a brown precipitate. This dissolves in more chloroform to form a blue solution. It is therefore useless as a vitamin reagent. (Steinle and Kahlenberg. "J. Biol. Chem.," 1926, 425.)

Arsenic trichloride (Rosenheim and Drummond) produces a blue colour similar to that produced by antimony trichloride which is discharged by alcohol, ether, ethyl acetate and acetic anhydride. Chloroform decreases but does not entirely destroy the colour. (Arsenious bromide produces a similar reaction, but inferior to that given by the chloride.)

Benzoyl chloride (Rosenheim and Drummond) in presence of zinc chloride yields a blue colour.

Bismuth trichloride in fine powder produces, with concentrated vitamin extracts dissolved in chloroform, a colour similar to that given by arsenic and antimony trichlorides, but it is much less reactive, and its state of sub-division exerts a great influence on the rate of reaction.

Anhydrous ferric chloride in a very fine state of subdivision produces a fluorescent reddish-violet colour. The difficulty of handling this reagent in an anhydrous condition places a limiting value on its usefulness.

Methyl sulphate (Rosenheim and Drummond) produces with cod-liver oils a violet colour. This reaction is neither powerful nor stable.

Phosgene in chloroformic solution yields no reaction, but when this reagent is added in minute quantities to various other reagents it greatly accelerates the reaction and tends to increase the amount of blue in the colour produced.

Phosphorus oxychloride produces a transient blue colour very rapidly changing to red. (It is of interest to note that both phosphorus pentachloride and trichloride give absolutely negative results.)

Phosphorus pentoxide (Fearon) produces with an oil a reddish-violet colour which is absorbed by the anhydride. This reaction is extremely sensitive to moisture, traces producing an almost immediate brown colour.

Silicon tetrachloride produces a rose pink colour when added to a relatively large quantity of the oil itself, the reaction not being very sensitive. (A number of reagents yield similar colours with cholesterol, but this reagent does not react with that substance.)

Stannic chloride (anhydrous) produces a deep blue colour rapidly changing to reddish-violet and then to red. The colour is not stable, and strong concentrations of stannic chloride are necessary to obtain the optimum colorimetric effect. As in the case of arsenic trichloride, dilution with chloroform produces a very marked decrease in reacting power.

Titanic chloride produces an olive green colour, but is only of interest insomuch as it does yield a positive reaction: as a quantitative reagent it has no value.

Trichloracetic acid (Rosenheim and Drummond).—A saturated chloroformic solution gives with cod-liver oil a violet colour. This reagent promised good results at first, but a sample with a high degree of purity gave only the faintest transient blue colour with cod-liver oil. A minute quantity of phosgene or methyl sulphate was sufficient to render the acid reactive, and for some time routine colour tests were carried out with an acid so activated with methyl sulphate. Owing to the bad keeping properties of this reagent, and its insensitiveness in presence of mere traces of moisture or alcohol, it was finally abandoned in favour of the antimony trichloride reagent. A certain amount of decomposition takes place on distilling trichloracetic acid, resulting in the formation of phosgene, hydrochloric acid and carbon-monoxide. The first fraction containing both hydrochloric acid and phosgene is remarkably active when tested with cod-liver oil, whereas the middle and purer fraction was almost inactive. Samples of the pure acid preserved for fifteen days in sealed tubes (both with access to light and in the dark) showed no increase in colorimetric reactivity, but became activated immediately on the addition of a minute trace of phosgene. The effective use of trichloracetic acid would thus seem to be dependent on the minute trace of phosgene often occurring in industrial samples.

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In addition Fearon has mentioned that pyrogallol and naphthol, phloroglucin, vanillin, amidol, and substituted phenols in the presence of trichloracetic acid in petroleum ether all give definite colour reactions. In the author's opinion none of these reagents is so good as antimony trichloride.

The colours produced by the above reagents with undiluted oil are too intense for any attempt at colour matching, and a diluent could not be found which would not interfere with the reaction. Anhydrous alcohol-free chloroform is the least objectionable, but with the exception of antimony trichloride it was found that unless saturated solutions of the reagents are employed the colours produced are variable, a slight excess of chloroform being sufficient to inhibit the reaction in most cases. In addition, the reaction was entirely negatived by traces of moisture or alcohol. In the case of trichloracetic acid pentane was found to be useful as a diluent, but not absolutely reliable. Takahashi states that an active cod-liver oil gives a blue colour with kaolin which is adsorbed, but the authors were unable to obtain this with a very active cod-liver oil. It should be noted that carrotene gives with many reagents similar colours to those given by vitamin A, and attempts made by the authors to obtain quantitative vitamin reactions on the concentrated extracts of various fruits and vegetables (such as tomatoes and carrots) are rendered useless, owing to the presence of lipochromes in natural vegetable colouring matters. For this reason butter, cream and milk may give slightly high results, owing to traces of lipochrome.

The above work was carried out in the laboratories of The British Drug Houses, Ltd., Mr. F. C. Hymas, B.Sc., A.I.C., carrying out many of the determinations.

The Vitamin Content of Tinct. Limonis Fort., B.P.C.

By STANLEY G. WILLIMOTT, PH.D., B.Sc., A.I.C., AND FRANK WOKES, B.Sc., A.I.C., PH.C.

[ABSTRACT]

At the 1925 Conference details were given of experiments indicating that cortex limonis contained considerable amounts of vitamin, but its varying digestibility, and difficulties in rationing, prevented quantitative measurements. It was thought that alcoholic extracts of the peel, which would be tolerated more readily, could be administered quantitatively. Trials with the weak or B.P. tincture (1 in 4) required so much that the alcohol began to have a lowering effect, and to avoid this tr. limonis fort., B.P.C. (1 in 1) was finally selected. To prepare the tincture, fresh Palermo lemons were washed with cold water, dried, and the peel cut off with a sharp knife, care being taken to remove as little as possible of the albedo, the yield being 7 to 8 per cent. of the total weight of lemons taken. The peel was chopped into small pieces 2 or 3 mm. long. It was found very difficult to carry out efficient maceration of 100 gm. of peel with 100 c.c. of 90 per cent. alcohol, and it was therefore decided to make the tincture in two or three stages. In the first stage either 33 or 50 gm. of peel was macerated with 100 c.c. of alcohol for seven to ten days. It was then filtered, measured, and tested. To each 100 c.c. of filtrate either 33 or 50 gm. of fresh peel were added, and maceration proceeded with and repeated if necessary until a 1 in 1 tincture was obtained. The rate of extraction was tested by samples taken daily from a macerating mixture, and estimating the total solids in the filtered solution. It was found that in twenty-four hours over 90 per cent. of the alcohol-soluble constituents had been extracted, and in two days extraction was practically complete. In drying the solids, to constant weight on a water bath, it was found very difficult to avoid a little charring. This was due to glucose, and by careful heat regulation the error did not exceed 2 or 3 per cent., as was shown by parallel determinations. It was thought that the percentage of reducing sugar might be of use in comparing different tinctures, and this was determined by direct titration of tincture (diluted five or ten times with distilled water) against Benedict's solution, using potassium ferrocyanide and acetic acid as external indicator. The results indicate that tr. limonis fort., B.P.C., should contain from 3 to 4 per cent. of reducing substances (calculated as glucose), but, unfortunately, the presence of a glucoside interfered with the accuracy of the results, which are summarised below, each figure being the mean of at least two analyses :—

Tinct. Limonis Fort., B.P.C.

Period of maceration, days	Specific gravity	Total solids per cent.	Reducing sugar per cent.
18 ..	0.964	5.9	—
21 ..	0.963	6.2	3.2
96 ..	0.957	6.2	3.1
85 ..	0.954	7.0	3.8
Commercial sample ..	0.940	4.3	2.3

Examination for Vitamin B

A.—Experimental group.—Eight rats (three male and five female), from 40 to 70 gm. in weight, were put on the basal diet *plus* :—

(1) Four drops of a potent Norwegian cod-liver oil per head per diem (to supply vitamins A and D).

(2) Tincture of lemons equivalent to 0.25 c.c. tr. limonis fort., B.P.C., per head per diem.

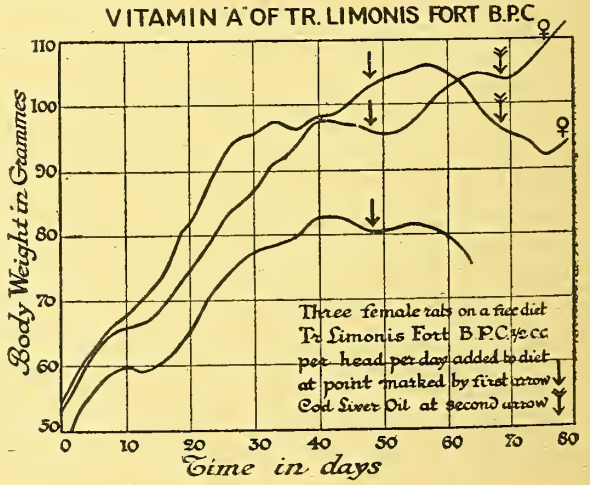
B.—Control group.—Nine rats (five male and four female), of approximately same age and weight as the experimental animals, were given the basal diet *plus* :—

(1) Cod-liver oil (to supply vitamins A and D).

(2) Autolysed yeast extract (1 in 1) 0.25 c.c. per head per diem (to supply vitamin B).

(3) Filtered lemon juice 0.2 c.c. per head per diem (to supply vitamin C).

Since cod-liver oil does not contain any appreciable amount of vitamin B, the difference in rate of growth therefore depends upon the vitamin B content in the tincture of lemons supplied. All the experimental animals grew well, showing no signs of ill-health, and at the end of seventy days, when the experiment was closed, the average weight of the males was 79 per cent. of that of the male controls, and of the females 91 per cent. of that of the female controls. From these results it may be concluded that 1 c.c. of tr. limonis fort., B.P.C., contains approximately as much vitamin B as 0.8 to 0.9 gm. of yeast, and that it is therefore a potent source of this accessory food factor. Osborne and Mendel, in testing orange albedo for vitamin B, found it necessary to use twenty times as much of this as the lemon flavedo employed in this experiment, which emphasises the necessity of ensuring that the peel used for preparing tincture of lemons shall contain as little albedo as possible.



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Examination for Vitamin A.—Tests on rats showed that tr. limonis fort., B.P.C., contains very little vitamin A.

Examination for Vitamin C.—Guinea pigs showed typical signs of scurvy, which was confirmed by autopsies, and it was concluded that tr. limonis fort., B.P.C., contains practically no vitamin C.

The authors consider that tr. limonis fort., B.P.C., contains very little vitamin A or vitamin C, but that it is a potent source of vitamin B, which has the advantage over yeast of being practically free from nitrogenous derivatives. They point out that the fact that peel of lemon and other citrus fruits contains large quantities of vitamin B (but practically no vitamin C), whereas the juice of the same fruits contains very little vitamin B, large quantities of vitamin C, and raises interesting questions concerning the origin of these vitamins. If vitamins are synthesised in the flavedo by the action of sunlight, as the authors suggested last year, it is difficult to explain the absence of vitamin C from peel. Through the courtesy of Mr. C. P. Wilson, Chief Chemist of the Research Department of the California Fruit Growers' Exchange, a supply of material has been rendered available for the further investigation of this problem. The authors express indebtedness for interest and assistance to Sir F. Gowland Hopkins, Professor T. B. Wood, and to Professor J. MacLean Thompson.

Astringent Drugs and the Proposed B.P. Revision

By ALAN H. WARE, PH.C.

[ABSTRACT]

THE formula for pulv. catechu co. is taken as a kind of text to initiate discussion on points made in this paper, since it contains no less than four catechol-phlobatannin drugs (catechu, kino, krameria root and cinnamon bark), the tannins therein being so closely related that it is difficult to believe they can differ materially in therapeutic activity. It is therefore a question whether it is necessary that so many closely related drugs should be included in the next Pharmacopœia. Some fifteen official drugs, including in particular the catechus and kinos, are discussed fairly fully from the standpoint of emphasising the need of introducing into the B.P. monographs additional tests of a chemical nature.

CHEMICAL NATURE AND REACTIONS OF VEGETABLE ASTRINGENTS

Astringency in the drugs discussed is due to the presence of one or more tannins in considerable quantity, and numerous facts compel the conclusion that individual tannins are many, and not few. Naturally occurring tannins fall into two very distinct classes, viz. :—

(1) Tannins of homogeneous phenolic structure, built up from pyrogallol, and called for convenience typical pyrogallol-tannins, but which consist of two rather distinct sub-classes.

(2) Tannins of heterogeneous phenolic structure, called "phlobatannins," which also fall into two sub-classes.

Typical pyrogallol-tannins yield on boiling under pressure with dilute sulphuric acid one or two simple pyrogallol derivatives (such as gallic acid or ellagic acid). Tannins yielding gallic acid are conveniently designated gallitannins (distinct types being gallotannin, hamamelitannin and chebulic acid). Tannins yielding ellagic acid are conveniently termed ellagitannins. Phlobatannins yield complex anhydrides termed phlobaphenes on boiling with dilute sulphuric acid, hence their name. Phlobaphenes are coloured bodies relatively insoluble in water but readily soluble in alcohol or aqueous alkali. Catechol tannins containing phloroglucinol-catechol groups give a green colour reaction with ferric chloride, but other phlobatannins may contain also a pyrogallol residue and give a violet colour with a ferric salt (e.g., the mimosa-tannin of *Acacia decurrens*). The author gives paragraphs, which it is suggested should be included in Appendix IV of the next B.P., with appropriate references thereto in the monographs relating to official astringents. These relate to Group Reaction for Tannins in Extractives; Typical Pyrogallol Tannins; and Phlobatannins.

B.P. MONOGRAPHS

Acaciæ Cortex.—It is suggested that the reference to *Acacia arabica* should be omitted, as bark is difficult to obtain, whereas *A. decurrens* bark is readily obtainable. The two barks for which there is no demand in this country, except for museum purposes, are far from identical with respect to tannin content, *A. decurrens* containing only phlobatannin, and *A. arabica* both a phlobatannin and a gallitannin. Australian bark from *Acacia decurrens*, which is one of the most important tanning materials, contains an unusual abundance of gallic acid.

Acidum Tannicum should be entitled "Acidum Gallotannicum," or preferably "Gallotannin." The ferric chloride test might be omitted, and the more specific test substituted, using Mitchell's solution of ferrous tartrate, after markedly acidifying with acetic acid, this giving a violet or blue coloration if the mixture be heated nearly to the boiling point and then cooled. Mitchell's solution contains 0.5 gm. Rochelle salt and 0.1 gram of ferrous sulphate per 100 c.c. The amount of gallic acid in tannic acid should be limited by the application of either Hooper's or Forbes' test.

Catechu Nigrum, as sold in England, is rarely satisfactory. Cutch from *Acacia catechu* is frequently overheated and consequently exhibits a low degree of solubility, while cutches with B.P. solubility are very often not genuine cutch. These facts are well illustrated by quantitative determinations by Mr. C. J. Jordan in the laboratories of Evans, Gadd & Co., Ltd., Exeter. The characters of genuine *Acacia catechu* cutch and of "mangrove" cutch respectively were determined by comparison with those of *Acacia catechu* heart-wood and of mangrove bark, supplied by Dr. Nierenstein.

Table I.—Examination of Cutches

No.	Moisture (% loss at 100°C.)	Soluble in 90% alcohol %	Insol. in alcohol %	Ash %	Description
1	11.34	59.88	29.08	6.86	Genuine, but overheated cutch.
2	14.36	77.64	8	6.64	Mangrove cutch.
3	14.11	48.29	37.6	4.52	Mainly genuine cutch.
4	16.6	64.4	19	7.17	Mangrove cutch.
5	12.6	54.8	32.6	2.56	Cutch probably from unofficial Acacia.

Mangrove cutch is commonly substituted for acacia cutch in commerce, and if "Black Catechu" is retained in the Pharmacopœia it will be necessary either to admit mangrove cutch as a variety or to introduce tests to detect its substitution.

The following specification is suggested for catechu nigrum :—

Gives the characteristic reactions of phlobatannins. An extractive gives with lime water a brown coloration, changing to a red precipitate, which falls slowly, but is obvious in two or three minutes (distinction from mangrove cutch, which gives a red ppt. at once, gambier, which may give a turbidity, but no very obvious precipitate, *in the time named*, and other extractives, which give a brown and not a red ppt.). A deal shaving dipped into an extractive and dried gives, on moistening with concentrated hydrochloric acid and warming, a rich magenta-purple stain (distinction from mangrove and certain other cutches). An extractive gives with 1 per cent. solution of copper sulphate and one drop of solution of ammonia, a precipitate which is *soluble* in the aqueous ammonia when it is added drop by drop until distinctly in excess (absence of mangrove cutch).

Catechu Pallidum is probably the most satisfactory phlobatannin drug on the market, and possesses the great advantage, compared with red gum, of being abundant and cheap. Gambier, in cubes, except for some surface alteration, retains for many years a high degree of solubility, both in water and alcohol. It deteriorates rapidly in alcoholic solution, and is best prescribed as powder. The most frequent adulterant appears to be starchy matter, and Mr. C. J. Jordan found starch in two

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powdered samples recently examined, which contained 54 per cent. and 39.47 per cent. of matter insoluble in alcohol. Additional characters and tests suggested include reactions characteristic of phlobatannins: "A fresh aqueous or water-diluted commercial extractive added to lime water, the latter being kept in excess, may give, after standing for five minutes, a turbidity, but should show no decided precipitation. (On longer standing a reddish ppt. separates.)" Quantitative assay by Chaston Chapman and Hooper's method might also be made use of, and the gambier-fluorescein test should be retained. Other distinctive reactions might be given, but the relatively negative response to the lime water test subserves to identify gambier and detect its adulteration. If the ferric chloride test for acacia cutch is retained it should be included under catechu pallidum also, as both drugs respond thereto. The same applies to the deal shaving test also.

Galla.—Tests are suggested for typical pyrogallol-tannins, and a positive response to Mitchell's reagent above, also for presence of ellagitannin, by adding a few small crystals of sodium nitrite to a little of the well-diluted extractive and heating gradually nearly to boiling point (a green colour-reaction being given). Hooper's or Forbes' methods of assay might be experimented with to settle more satisfactorily the question of possible adulteration with other commercial galls.

Hæmatoxyli Lignum.—A more distinctive test is suggested as follows:—

An aqueous extractive poured slowly into lime water gives a deep violet coloration. A further portion of extractive, to which alum is added, becomes wine-purple on shaking and standing for a few minutes.

Hamamelidis Cortex give, when diluted with water, reactions characteristic of typical pyrogallol-tannins, and also give with acid sodium phosphate and ferric citrate a deep-brown solution or precipitate (and not a violet coloration is given, distinction from extractives containing gallotannin).

Hamamelidis Folia, tested as *Hamamelidis Cortex*, and distinguished therefrom by the yellow film on evaporating dish when sufficiently dilute alcoholic extractive of the leaves, is partially evaporated with 10 drops of dilute sulphuric acid.

Kinos and Butea Gum possess many physical and chemical properties in common, being typical catechol-tannin bodies. [Eucalyptus kinos containing pyrogallol-tannins are rarely, if ever, sold in Great Britain.]

Butea Gum, judging by samples imported into England for museum purposes, is a most unsatisfactory article, with a particularly low solubility in water, and it should be omitted from the pharmacopœia. The particles of this kino are attached to pieces of wood or bark, and it is likely that this is the natural condition of the drug, and not sophistication, as has been suggested. Good parcels of this kino are difficult to get. In the subjoined table the figures for samples Nos. 4 and 5 relate to samples offered to the British Drug Houses, and were supplied by Mr. R. R. Bennett. No. 4, although a little dubious in appearance, turned out to be genuine Malabar kino, but No. 5 proved to be Butea gum. Mr. C. J. Jordan worked out the other results for genuine Malabar kinos, No. 2 being a recent purchase. The deficiencies in solubility in Nos. 1 and 3 were undoubtedly due to their age. Comparison of No. 1 Malabar kino in Table II with No. 1 Eucalyptus kino in Table III seems to indicate the superiority of a good typical red gum to Malabar kino with respect to stability on keeping.

Eucalyptus Kino.—Although good pharmaceutical red gum is scarce and high in price, the article on sale appears to be identical with that sold during the past thirty or thirty-five years, notwithstanding the fact that the B.P. does not specify a precise source for this kino, and that kinos with very distinct chemical characters are obtained from various eucalypts and allied genera. It is almost certain that the commereial red gum is obtained invariably from *Eucalyptus rostrata.* All the specimens of commercial pharmaceutical red gum

Table II.—Examination of Malabar and Supposed Malabar Kinos

No.	Moisture (% loss at 100°C.)	Solubility in water %	Insoluble in water %	Ash %	Description
1	15.4	63.2	22.8	1.55	Genuine museum sample (30 years old).
2	13.5	84.0	3.4	2.42	Genuine commercial sample (recent).
3	14.1	53.0	35.5	1.39	Genuine (supplied by Dr. Nierenstein)
4	—	77.5	—	2.1	Genuine commercial sample.
5	—	57.2	—	18.7	Characters indicate to be Butea gum.

examined by the author during the past ten years agree in chemical characters with those of sample No. 4 (Table III), which was supplied to the Pharmaceutical Society by Messrs. Bosisto & Co., Australia, as having by them been obtained from *E. rostrata.* The specimen was available through the kind offices of Professor H. G. Greenish. If a kino extractive is boiled with a few drops of tincture of iodine (in slight excess) for one minute, and the mixture cooled, a precipitate is given in the case of red gum which is soluble in solution of ammonia, while that given in the case of Malabar kino is insoluble.

The generally satisfactory character of commercial red gums as supplied by wholesalers is illustrated by samples Nos. 2 and 3 in the following table, the quantitative results being by Mr. C. J. Jordan:—

Table III.—Examination of "Red Gums"

No.	Moisture %	Solubility in hot water %	Insoluble in water %	Ash %	Description
1	14.73	83.27	2	0.07	Genuine red gum (museum specimen 30 years old).
2	15.0	84.0	1	0.35	Genuine commercial sample (recent).
3	16.72	82.88	0.4	0.19	Genuine commercial sample.
4	13.92	85.68	0.4	0.35	Sample supplied by Messrs. Bosisto as from *E. rostrata.*

The amount of ash is much less than in the Malabar kinos, but the author considers that there seems to be much less reason for describing these drugs in separate monographs than for the inclusion of the two acacia barks in the same monograph, and accordingly suggests the amalgamation of their separate monographs with modifications and extensions of chemical tests to exclude butea gum and kino from *Eucalyptus calophylla,* which contains an appreciable proportion of ether-soluble matter (consisting largely of aromadendrin, catechin and gallic acid).

Krameriæ Radix.—The tannin of Para rhatany is not identical with that of Peruvian rhatany. The precipitate given by boiling a decoction of the Para rhatany with iodine is insoluble in ammonia, while that from Peruvian rhatany is soluble. In most other respects the tannins are in close agreement. It is suggested that tests might be inserted advantageously if the drug is retained for phlobatannins, and distinction from mangrove extractives. Although the use of 60 per cent. alcohol effectively prevents the precipitation or gelatinisation of the phlobaphene in a tincture, almost complete dehydration of the tannin occurs on keeping, and neither catechu, kino, nor krameria tinctures which have been kept for a while will give very characteristic colour-reactions with iron salts for catechol-tannins. The products of dehydration or oxidation tend to give brown colours (instead of green or violet respectively) to the tests with ferric chloride or ferrous sulphate in slightly alkaline medium. The colour of such tinctures is largely

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due to this alteration. The phlobaphenes are readily precipitated on diluting with acidulated water.

Myrobolanum.—This contains typical pyrogallol-tannins, and tests are suggested with ferric citrate and acid sodium phosphate for distinction from galls, etc., and with sodium nitrite for presence of ellagitannin.

The writer especially desires to thank Mr. C. J. Jordan for his kind offices in determining most of the quantitative results given in the tables, and also Messrs. Evans, Gadd & Co., Ltd., of Exeter, in whose laboratories Mr. Jordan's work was done. He also wishes to thank Dr. Nierenstein for specimens of some of the substances examined; the Pharmaceutical Society and Professor Greenish for the specimen of "red gum" supplied by Messrs. Bosisto; and The British Drug Houses, Ltd., and Mr. R. R. Bennett for specimens of cutches, kinos and acacia bark, as well as for sending very useful and interesting particulars about some of the specimens sent. The experimental work done by the writer was carried out in the laboratories of the University College at Exeter or of the Municipal Technical College of Plymouth.

The drugs dealt with are classified as follows :—

I.—Phlobatannin Drugs :—(1) Catechol-tannin drugs : Cutches, gambier, butea gum, Malabar kino, eucalyptus kino and the two rhatany roots. (2) Mimosa-tannin drug : *Acacia decurrens* bark.

II.—Hamamelitannin Type : Hamamelis leaves and bark, and logwood.

III.—Gallotannin Drug : Gallotannic acid.

IV.—Drugs containing a Gallitannin and Ellagitannin : Galls and myrobolans.

V.—Drug containing a Gallitannin and a Phlobatannin : *Acacia arabica* bark.

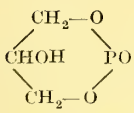
Analysis and Composition of Commercial Glycerophosphates

By G. J. W. Ferrey, B.Sc.

[Abstract]

Glycerophosphates have attained a definite position in medicine and pharmacy, being prescribed as nerve and general tonics. The manufacture of glycerophosphate preparations is attended by difficulties similar to those met with in making inorganic phosphate syrups, viz. :—Precipitation, inversion of sucrose, and crystallisation. The last two factors are ascribed to acidity, and the former to inorganic phosphate present primarily present or formed by decomposition of glycerophosphate during storage. There is also a considerable variation in glycerophosphate content and composition of products of different makers, ascribable to variations in the glycerophosphate salts themselves. The object of this paper is to examine some of the glycerophosphates at present on the market, and to inquire into the validity of titration in their routine assay. The use of glycerophosphates in medicine arises from glycerophosphoric acid being a constituent of the phosphatide lecithin, in which it occurs in colloidally combined with the complex amino-compound choline. This and the optical activity of the natural acid makes it doubtful whether synthetic inactive glycerophosphoric acid possesses any great advantage over phosphoric acid.

Synthetic glycerophosphoric acid is made by two methods : (*a*) The interaction of glycerol with phosphoric acid (sp. gr. 1.5) at 105 to 110°C, which gives chiefly an α-stereorisomer of glycerophosphoric acid, and (*b*) the formation of a diglyceryl ester by interaction of sodium hydrogen phosphate with two molecules of glycerol. On hydrolysis with caustic soda the product consists chiefly of the β-acid. Large quantities of crystalline β-glycerophosphoric acid are prepared by this method, the residual liquors containing α-acid being worked up into the sodium glycerophosphate liquors of commerce. According to Power and Tutin esterification by process (*a*) results mainly in the dibasic acid $(HO)_2C_3H_5.O.PO(OH)_2$, but there is also produced some of the monobasic diester



The presence of the latter owing to excessive temperature lowers the basicity of the product. The specimens examined were samples bought commercially, or salts specially purified. Re-crystallised sodium glycerophosphate and calcium glycerophosphate had a P_H range of 8.5 to 9.5 for solutions containing 1 gm. in 25 c.c., this being close to the acid end-point of thymolphthalein. The specially purified samples and several commercial specimens were either neutral or very faintly acid to this indicator, and previous to titration the salt was accordingly first neutralised to thymolphthalein by addition of decinormal acid or alkali. Dimethylamino-azobenzene (abbreviated "azo" in tabulations) was used in preference to methyl orange as it possesses the same range (P_H2.9 to 4.0), but it gives a more clear and sharp full yellow endpoint. In the titration of glycerophosphoric acid and glycerophosphates, the colour change corresponds to the acid end-point.

Glycerophosphoric Acid

Glycerophosphoric acid was examined in the form of 20 per cent. solution only. Five grams were diluted with water to 25 c.c., a few drops of "Azo" indicator added, and the solution titrated to the first full yellow end-point with semi-normal sodium hydroxide. After the addition of a few drops of thymolphthalein indicator the titration was continued to the first suggestion of blue, which gave the c.c.s of total alkali in the following results :—

Glycerophosphoric Acid 20 per cent.

Maker	Weight in gms.	C.c. N/2 NaOH "Azo"	Calc. % 1st stage	C.c. N/2 NaOH Total	Calc. % 2nd stage
A ..	5.477	13.4	21.05	30.1	23.65
B ..	6.310	14.8	20.18	29.7	20.32
	5.527	13.15	20.47	27.8	21.10
C ..	6.682	16.2	20.84	32.65	21.03
D ..	6.996	16.7	20.53	35.1	21.58

The reason for the higher results in the second stage titration appears to be due to traces of monobasic glyceryl ester, only titratable in the second stage, but the small amounts of metallic radicle present in some cases cause a similar result. It would appear from the above results that manufacturers adjust their products by titration to methyl orange, and that the presence of 20 per cent. of real glycerophosphoric acid can be relied upon.

Glycerophosphates

Sodium glycerophosphate (crystalline and 50 per cent. solution), potassium glycerophosphate (50 per cent. solution), calcium glycerophosphate and magnesium glycerophosphate were examined. The sodium or potassium salt (in 1 in 25 solution) should be alkaline to phenolphthalein and neutral or very faintly acid to thymolphthalein. After adjustment to the exact white end-point with thymolphthalein, add dimethylaminoazobenzene indicator and titrate to a distinct pink. Calcium or magnesium glycerophosphates are examined similarly for alkalinity in 1 in 25 suspension. Owing to difficult solubility, the best procedure is to dissolve 1 gm. in semi-normal hydrochloric acid (10 to 15 c.c. being required) and titrate back with semi-normal alkali to the yellow end-point. The difference equals the acid taken up, and it will be greater or less than it should be according as the original salt was alkaline or acid. This deficiency or excess, which is a measure of the acidity or alkalinity, may be estimated by adding thymolphthalein and titrating to the first distinct appearance of blue. This latter figure gives the true normal glycerophosphate present if inorganic phosphate is absent, but the latter cannot be differentiated by simple titration from glycerophosphate in the presence of calcium or magnesium. In order to test the validity of the titration

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method, some of the samples were dried and ignited, and calcium and magnesium estimated. The results afford good evidence in favour of the usefulness of the method of titration in routine analysis. In conjunction with simple ignition and in the absence of inorganic phosphate, it provides an effective means of detecting "di-ester" or similar condensation products.

Maker	Titration %	Ignition %	Loss on drying %	Reaction to thymolph.	Reaction to phenolph.	Alkalinity or acidity on 1 gm. (in c.c. N/10 soln.)
		Sodium Glycerophosphate				
A	—	37.8 (anhyd.)	62.0	—	—	—
1	47.2 ($3H_2O$)	47.4 ($3H_2O$)	—	Neutral	Alkaline	—
2	68.36 (anhyd.)	—	—	—	—	—
	99.67 ($5\frac{1}{2}H_2O$)	99.87 ($5\frac{1}{2}H_2O$)	—	Neutral	Alkaline	—
B1	45.2 (anhyd.)	45.7 (anhyd.)	53.8	Slightly acid	Slightly acid	0.32
	49.0 ($1H_2O$)	49.52 ($1H_2O$)	—	—	—	—
2	51.14 ($1H_2O$)	51.36 ($1H_2O$)	—	Faintly acid	Alkaline	0.25
3	50.25 ($1H_2O$)	50.59 ($1H_2O$)	—	Neutral	Alkaline	—
C	50.37 anhyd.)	50.51 (anhyd.)	—	Very faintly acid	Alkaline	0.1
D	34.99 anhyd.)	35.37 (anhyd.)	—	Alkaline	Strongly alkaline	1.1
	51.01 ($5\frac{1}{2}H_2O$)	—	—	—	—	—
E	23.3 anhyd.)	33.0 (anhyd.)	—	Acid (Inorg.-phosphate = 1.1% H_3PO_4)	Acid	1.05
	25.36 ($1H_2O$)	35.75 ($1H_2O$)	50.5			
	33.97 ($5\frac{1}{2}H_2O$)	48.11 ($5\frac{1}{2}H_2O$)	—	—	—	—
F1	29.8 (anhyd.)	38.7 (anhyd.)	—	Acid	Acid	0.7
2	67.74 anhyd.)	67.82 (anhyd.)	—	Neutral	Alkaline	—
		Sodium Glycerophosphate, recrystallised				
A	68.93 (anhyd.)	68.99 (anhyd.)	30.7	Neutral	Alkaline	—
B	67.87 (anhyd.)	67.72 (anhyd.)	—	Neutral	Alkaline	—

Samples A2 and F2 consisted of crystalline β-glycerophosphate. The presence of esters other than the normal is clearly indicated in samples E and F1 on comparing columns headed "Titration" and "Ignition." The most remarkable feature appears to be the variation in "water of crystallisation," each manufacturer adopting a different standard. The majority of the 50 per cent. solutions on the market are not adjusted to a basis of 50 per cent. anhydrous sodium glycerophosphate, by weight, which fact is all the more remarkable since 50 per cent. potassium glycerophosphate solution would appear always to be made to contain 50 per cent. of the anhydrous salt.

Potassium Glycerophosphate

Maker	Titration %	Ignition %	Loss on drying %	Inorg. phosph. %	Reaction to thymolph.	Reaction to phenolph.	Acidity or alkalinity on 1 gm. (in c.c. N/10 soln.)
A1	54.0 (anhyd.)	—	45.4	1.1	Acid	Slightly alkaline	0.1
B1	50.9 (anhyd.)	51.1 (anhyd.)	—	0.6	Faintly acid	Faintly alkaline	—
2	50.0 (anhyd.)	—	50.27	1.0	,,	,,	—
C	52.35 (anhyd.)	52.4 (anhyd.)	—	less than 0.02	Very slightly acid	Alkaline	0.05
D1	51.29 (anhyd.)	51.43 (anhyd.)	48.36	0.1	,,	,,	—
2	52.7 (anhyd.)	53.4 (anhyd.)	—	0.3	,,	,,	—
E	40.3 (anhyd.)	52.3 (anhyd.)	—	2.5	Acid	Strongly acid	1.5
	48.7 ($3H_2O$)	—	—	—	—	—	—

The best solutions appear to be only slightly acid to thymolphthalein. In general inorganic phosphate is higher in the potassium than in the sodium solutions, probably due to the lesser stability of the former salt.

Calcium glycerophosphate varied in solubility, due to presence of impurities, the composition of commercial products agreeing with the presence of one molecule of water of crystallisation, though, owing to presence of β-salt, the loss on drying at 130° C. may be slightly less than this. Solubility tests (at 14-16° C.) on pure salts gave solubility of 1 in 43.7 (for 96.0 to 99.6 per cent. salt) and 1 in 44.7 for calcium glycerophosphate precipitated by alcohol (testing 100.2 per cent.), this approaching closely the limit of 90 per cent. soluble with one part of salt in 40 parts of water. The proportion of insoluble β-salt was negligible in the best samples, but there are specimens exceeding the 10 per cent. limit of insolubility. In two specimens with residues of over 10 per cent. insoluble in 100 parts of water there appeared to be organic phosphorus compounds, probably the calcium salt of the "di-ester." Carefully conducted experiments gave a solubility of 1 in 22 for α-calcium glycerophosphate at 15-16° C., agreeing with Carré, Contardi, Martindale (Vol. II), and Squire. Solubilities recorded for β-calcium glycerophosphate vary more considerably, possibly owing to equilibrium being slowly attained, which varies with mode of preparation and consequent physical state of salt. The actual solubility of calcium β-glycerophosphate approached closely that given in the British Pharmaceutical Codex and Martindale (Vol. I) for the α-salt (90 per cent. soluble with 1 gm. in 40 c.c. water, and all soluble on addition of further 100 c.c. water). The analytical data obtained on a number of commercial and specially prepared samples are as follows :—

Maker	Titration %	Ignition %	Metal %	Reaction to thymolph.	Reaction to phenolph.	Alkalinity on 1 gm. (in c.c. N/10 alk.)
		Calcium α-Glycerophosphate				
A1	95.7 ($1H_2O$)	96.3	16.83	Neutral	Alkaline	—
2	(Contained citric acid)		15.37	Acid	Acid	—
B1	90.2 (anhyd.)	—	—	—	—	—
	97.65 ($1H_2O$)	97.83	17.05	Neutral	Barely alkaline	—
2	91.7 (anhyd.)	—	—	—	—	—
	99.55 ($1H_2O$)	99.7	17.41	Neutral	Alkaline	—
3	98.4 ($1H_2O$)	98.7	—	Very faintly alkaline	Alkaline	0.1
C	98.7 ($1H_2O$)	98.81	17.2	Neutral	Alkaline	—
D	87.2 (anhyd.)	—	—	Slightly alkaline	Alkaline	0.2
	94.7 ($1H_2O$)	95.8	16.5	—	—	—
E	80.05 (anhyd.)	81.34	15.0	Alkaline	Alkaline	0.5
	100.59 ($3H_2O$)	—	—	—	—	—
a	100.32 ($1H_2O$)	—	17.47	Very faintly acid	Alkaline	—
b	99.86 ($1H_2O$)	—	17.28	Neutral	Alkaline	—
		Calcium β-Glycerophosphate				
A1	98.64 (anhyd.)	98.59	18.87	Very faintly acid	Alkaline	—
B	Described as "Neutral and insoluble," but contained equiv. 12.8 per cent. H_3PO_4)		20.9	Acid	Acid	—
**a*	100.2 (anhyd.)	99.98 (anhyd.)	—	Neutral	Alkaline	—
b	96.0 (anhyd.)	96.4 (anhyd.)	—	Very faintly acid	Alkaline	—
	104.0 ($1H_2O$)	—	—	—	—	—
c	99.5 (anhyd.)	—	—	Neutral	Alkaline	—

* Compare preceding Table.

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The calcium α-glycerophosphates showed a fairly high degree of purity and constancy in composition. Only one sample contained citric acid to aid solubility. Sample B of the β-glycerophosphates is an example of salt suitable for tablets, its identity as mainly β-salt being readily accomplished by determining its solubility, since the inorganic phosphate (evidently calcium phosphate) does not interfere appreciably with the solution of the glycerophosphate. From the α-glycerophosphates of calcium, inorganic phosphate is practically absent, some manufacturers working to a maximum of 0.1 per cent., but in other cases the proportion is somewhat higher.

Magnesium glycerophosphate gave figures indicating more or less water of crystallisation. Apart from this, the main impurity is a slight excess of magnesia, which, unless its presence is appreciated, leads to impossible results on titration. This emphasises the importance of estimating the actual glycerophosphate only by the figure obtained on back titration from "Azo" yellow end-point to the thymolphthalein blue end-point. With glycerophosphate estimated in this way, the results obtained correspond to water present in chemical combination, and not as a result of insufficient drying or absorption during storage. Only from one source was an anhydrous magnesium glycerophosphate obtained. The thymolphthalein end-point is apt to be obscured by the formation of a gelatinous precipitate which absorbs the indicator and renders the first appearance of blue difficult to observe. The formation of this precipitate is due to the local concentration of alkali where it enters from the burette, and a satisfactory end-point obtained by vigorous stirring or shaking to dissipate this precipitate, and it may be necessary to add a little more indicator a fraction of a c.c. from the true end-point.

Magnesium Glycerophosphate

Maker	Titration %	Ignition %	Metal %	Loss on drying %	Reaction to thymolph.	Reaction to phenolph.	Alkalinity per gm. c.c. of N/2 Acid.
A1	99.2 (anhyd.)	100.3 (anhyd.)	12.81	0.83	Slightly alkaline	Alkaline	0.15
A2	98.9 (anhyd.)	99.4 (anhyd.)	12.57	2.04	Slightly alkaline	Alkaline	0.1
B1	99.15 ($4H_2O$)	99.42 ($4H_2O$) 72.55 (anhyd.)	9.15	25.7	Slightly alkaline	Alkaline	0.15
2	99.2 ($4H_2O$)	99.47 ($4H_2O$) 72.66 (anhyd.)	9.2	26.3	—	Alkaline	—
3	98.5 ($4H_2O$)	97.34 ($4H_2O$) 71.1 (anhyd.)	9.0	27.5	—	Alkaline	—
C	89.1 (anhyd.) 97.35 ($1H_2O$)	89.69 (anhyd.)	11.4	—	Neutral alkaline	—	—
D	95.05 ($2H_2O$) 80.2 (anhyd.)	95.9 ($2H_2O$)	10.1	14.1	Faintly alkaline	Alkaline	—
E	72.0 (anhyd.) 98.68 ($4H_2O$)	72.46 (anhyd.) 99.27 ($4H_2O$)	9.04	—	Markedly alkaline	Alkaline	4.0 c.c. N/2

From five sources only of magnesium glycerophosphate four different amounts of water of crystallisation were found :—

Conclusions drawn from the above results are :

(*a*) The alkali and alkaline earth salts of glycerophosphoric acid found on the English market are for the most part definite salts of reasonable purity.

(*b*) Condensation products, such as the "di-ester," are usually absent.

(*c*) The most noticeable difference between the products of different manufacturers is the variation in the amount of water of crystallisation, especially in the cases of the magnesium salt and 50 per cent. sodium glycerophosphate.

(*d*) Titration by acid and alkali gives an accurate and rapid means of estimating the glycerophosphate content of a given salt (in the absence of added organic acids and of more than minute amounts of inorganic phosphate). Where appreciable amounts of inorganic phosphate are present it is, of course, possible to apply a correction.

It would be interesting to know whether there is any reason for the considerable variation in the anhydrous salt content in the 50 per cent. solutions of sodium glycerophosphate, especially as this variation does not seem to be reflected in the corresponding 50 per cent. potassium solutions. Again, there appears to be room for improvement in statements regarding the solubility of calcium α-glycerophosphate, and the variation in the water associated with magnesium glycerophosphate should be indicated or a definite statement made regarding a percentage of water of crystallisation.

The investigations were carried out in the analytical laboratory of Hough, Hoseason & Co., Ltd., Manchester.

Diphenylamine as Indicator in Determination of Iron in Pharmaceutical Preparations

By F. J. DYER, B.Sc., A.I.C., PH.C., and W. B. FORBES, M.Sc. (VICT.).

[ABSTRACT]

THE attention of the authors was drawn to the use of diphenylamine as an indicator in ferrous titrati by an abstract in THE CHEMIST AND DRUGGIST for De ber 26, 1925 (p. 891). The use of diphenylamine as internal indicator in the titration of ferrous iron with potassium dichromate was introduced by Knop, and it was applied to assay of Massa Ferri Carbonatis U.S.P. by Krantz and Vidal as above. With diphenylamine as indicator, the end-point of the titration is marked by the formation of an intense violet-blue coloration which completely masks the green colour due to chromic sulphate. Immediately before the end-point the green colour acquires a greyish-green shade, but the end-point is quite definite, the change from grey green to violet blue being brought about by the addition of on drop of decinormal potassium dichromate solution to the solution of ferrous salt titrated. In preliminary experiments it was found that saccharated iron salts gave constant results with a fair end-point, whereas iron pill gave variable results, but a better end-point.

Saccharated Iron Carbonate.—The clearer end-point in titrations of iron pill was attributed to the presence of sodium sulphate, which was accordingly added to the solution before titrating saccharated iron carbonate, with good results. Variations in method were tried, using sulphuric acid (dilute and strong), or dilute phosphoric acid, with or without ammonium sulphate or sodium sulphate. The best results were obtained by dissolving the sample in concentrated sulphuric acid and adding sodium sulphate. Five estimations of saccharated iron carbonate gave percentages of ferrous carbonate, averaging 55.98 per cent.; minimum 55.89 per cent., maximum 56.22 per cent. Dilute phosphoric acid with sulphuric acid is recommended by Knop, but this was not an improvement. On the contrary, excess of phosphoric acid obscured the end-point.

Saccharated Iron Phosphate. — Similar experiments were tried as with saccharated iron carbonate, and the same conclusions established. Five estimations of saccharated iron phosphate gave percentages of ferrous phosphate, averaging 62.03 per cent., minimum 61.87 per cent., maximum 62.19 per cent.

Iron Pill.—In a first series of experiments, iron pill was found to give an excellent end-point by dissolving it in dilute sulphuric acid alone, the results, however, being somewhat variable. In a second series of experiments a definite quantity of iron pill was dissolved in dilute sulphuric acid, made up to a definite volume, and an aliquot portion titrated. The following interesting series of results (expressed in percentages of ferrous carbonate) show that the solution oxidised progressively on standing during one hour :

24.14, 22.78, 21.92, 20.92, 20.92, 19.93, 18.57, and 17.08.

Subsequent determination suggested that the addition of phosphoric acid or of ammonium sulphate to the

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sulphuric acid used for dissolving iron pill inhibits this oxidation. With phosphoric acid the end-point is affected, but five estimations, using sulphuric acid containing ammonium sulphate, gave a maximum 19.81 per cent., and a minimum 19.67 per cent. of ferrous carbonate. The best results were obtained by dissolving the iron pill mass in dilute sulphuric acid, to which ammonium sulphate had been previously added. Though a considerable degree of hardening occurred during nine days, the ferrous carbonate suffered little oxidation in the centre of the mass (which still contained 19.53 per cent. of ferrous carbonate). The oxidation in acid solution is remarkable, and cannot be due to atmospheric oxidation, since saccharated iron carbonate gave constant results. Such oxidation may be due to oxidase in gum acacia. This was checked by making up a pill mass without containing gum acacia, which under similar conditions to those above did not show the oxidation previously described in the case of iron pill. The authors conclude that diphenylamine is superior to and should be substituted for potassium ferri-cyanide as an internal indicator in the assay of pharmacopœial iron preparations.

The following assay processes are given :—

Suspend 0.5 gm. of saccharated iron carbonate (or saccharated iron phosphate) in 2 mils. of water, add an equal quantity of concentrated sulphuric acid, and dissolve, warming gently if necessary. Dilute this solution with 15 mils. of dilute sulphuric acid and 50 mils. of water, cool, add 1 mil. of diphenylamine solution, and titrate immediately with decinormal solution of potassium dichromate. A violet-blue colour, showing no trace of green, should not be obtained until 21.6 mils. (or 17.95 mils.) have been added.

Dissolve 1 gm. of iron pill in 25 mils. of dilute sulphuric acid in which 1 gm. of ammonium sulphate has been previously dissolved, using gentle heat if necessary. Dilute to 50 mils. with water, cool, and titrate immediately with decinormal solution of potassium dichromate, using 1 mil. of diphenylamine as indicator. A violet-blue colour showing no trace of green, should not be obtained until 19.4 mils. have been added. (Presence of 22.5 per cent. of $FeCO_3$.)

Diphenylamine Indicator is made by dissolving 0.2 gramme of diphenylamine in concentrated sulphuric acid, and making up to 100 c.c. The amount of diphenylamine used (0.002 gm.) is not sufficiently large to necessitate a factor being used (being equivalent to 0.0125 c.c. of decinormal potassium dichromate).

Additional notes by the authors are (1) that a solution of diphenylamine in phosphoric acid does not act as an indicator. (2) Diphenylamine can be used as a test for a nitrate in the presence of sulphuric acid. (3) Potassium chloride also increases the intensity of the blue colour, but has no advantage over sodium sulphate.

The Analysis of Glycerophosphate Syrups

By G. MIDDLETON, B.Sc., A.I.C.

[ABSTRACT]

IN the manufacture of compound syrup of glycerophosphates, B.P.C., the glycerophosphates do not completely dissolve, a residue, consisting mainly of calcium glycerophosphate, being filtered off. This is not only a waste of material, but the resultant syrup varies in composition with temperature and other conditions during manufacture. The following investigation was undertaken to determine how closely the composition of the finished syrup agrees with its formula. The analysis of compound syrup of glycerophosphates presents a problem of some complexity, owing to difficulty of separating inorganic constituents, whilst the presence of sugar and citric acid tends to prevent complete precipitation of iron and of phosphates (likely to be present through hydrolysis of glycerophosphates). The methods finally adopted were the result of a number of trials.

Iron was found to be completely precipitated from the diluted syrup by the addition of sodium hydroxide, though direct ignition of syrup and extraction of the residue with acid gave low results. Detailed procedure is as follows :—

50 c.c. of the syrup are diluted with about 400 c.c. of water and precipitated by the addition of sodium hydroxide and a little bromine water to oxidise any ferrous compounds. The mixture is brought to the boil and then allowed to settle. The clear upper layer is decanted through a layer of filter paper pulp in a Gooch crucible, the residue being afterwards transferred to the filter. The precipitate is dissolved in dilute hydrochloric acid and again precipitated as before. It is then redissolved in hydrochloric acid, potassium iodide is added, and the solution titrated with decinormal sodium thiosulphate.

Calcium and Magnesium are estimated on separate portions of the syrup. The whole of the iron and some calcium is precipitated by the addition of sodium hydroxide. Most of the calcium was extracted from the precipitate by adding a slight excess of acetic acid, and from the residue a little more calcium was obtained by the ammonium acetate method. Calcium and magnesium, after removal from the filtrates as phosphates, were separated by precipitation of the calcium as oxalate in slightly acid solution. Details are as follows :—

40 c.c. of the syrup are precipitated as described for the estimation of iron, and after allowing to settle, the clear liquor is poured off as far as possible through a layer of filter paper pulp in a Gooch crucible. The residue is treated with a slight excess of dilute acetic acid (about 3 c.c. of 33 per cent. acid), added drop by drop, in quantity just sufficient to dissolve the bulk of the precipitate and leave undissolved the iron phosphate. The liquid is then filtered through the same filter and washed with a little water. The residue is dissolved in dilute hydrochloric acid, neutralised as far as possible without forming a permanent precipitate, 4 c.c. of 5 per cent. ferric chloride solution are added, then excess of ammonium acetate and water to about 400 c.c. The liquid is brought to the boil and filtered through a pleated filter paper, keeping as hot as possible while filtering, and washing once with hot water containing a little ammonium acetate. The two filtrates are boiled down and the calcium and magnesium precipitated by the addition of sodium phosphate and ammonia.

The precipitated phosphates are dissolved in dilute hydrochloric acid and diluted to about 400 c.c.; 40 c.c. of 5 per cent. ammonium oxalate, about 20 c.c. of ammonium chloride solution, and a few drops of methyl orange are then added. The liquid is brought to the boil and dilute ammonia added drop by drop to the boiling liquid until it just turns yellow, the addition being made at such a rate that it occupies about half an hour. After standing for four hours, the precipitated calcium oxalate is filtered off and ignited. After moistening with ammonium carbonate solution it is again ignited gently and the product weighed as $CaCO_3$. The filtrate is boiled down, the magnesium precipitated by the addition of sodium phosphate and ammonia, ignited, and weighed as $Mg_2P_2O_7$.

Accuracy of Method.—Test analyses were carried out on a specially prepared syrup made according to the B.P.C. formula, but including an additional amount of glycerophosphoric acid to dissolve the whole of the salts. This syrup contained the following percentages (weight in volume) : Iron glycerophosphate (containing 20 per cent. Fe_2O_3), 0.47 per cent.; calcium glycerophosphate (containing 91.3 per cent. monohydrate), 2.28 per cent.; magnesium glycerophosphate (containing 99.5 per cent. of the dihydrate), 1.14 per cent. The following results were obtained :—

Quantity of syrup taken	$N/10$ $Na_2S_2O_3$ used	Fe_2O_3 found	Iron glycerophosphate (20% Fe_2O_3) found
		%	%
50 c.c.	5.9 c.c.	0.094	0.47
50 c.c.	5.9 c.c.	0.094	0.47

[0.47 per cent. of iron glycerophosphate was present, the B.P.C. formula requiring 0.57 per cent.; the former amount was taken in error, but serves equally well to demonstrate accuracy of analysis.]

Quantity of syrup taken	Weight of $CaCO_3$ obtained	CaO found	Calcium glycerophosphate found	Weight $Mg_2P_2O_7$ obtained	MgO found	Magnesium glycerophosphate found
	gram	%	%	gram	%	%
40 c.c ..	0.363	0.508	2.07	0.210	0.1901	1.09
40 c.c. ..	0.366	0.512	2.09	0.210	0.1901	1.09
40 c.c. ..	0.367	0.514	2.09	0.205	0.1856	1.07

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[Actually present: 2.08 per cent. (w/v) of calcium glycerophosphate (+1 H_2O) and 1.13 per cent. (w/v) of magnesium glycerophosphate (+2 H_2O).]

The figures for magnesium are slightly low, probably owing to the slight solubility of magnesium ammonium phosphate. For practical purposes, however, the results are sufficiently accurate.

Results of Analyses.—A "true B.P.C." syrup was made, according to the directions given in the B.P.C., with mechanical stirring for six hours to ensure solution being as complete as possible. This syrup was allowed to stand with occasional shaking for one week before it was finally filtered. The other syrups analysed were five samples from different sources supplied as syrup. glycerophosph. co. B.P.C., and four proprietary forms of syrup. glycerophosph. co. The results are given in tabular form.

Syrup	Iron glycerophosphate (20% Fe_2O_3)	Calcium glycerophosphate (+1H_2O)	Magnesium glycerophosphate (+2H_2O)	Time for precipitation
	%	%	%	
True B.P.C. ..	0.39	1.60	1.00	7 days
Supplied as B.P.C.				
A	0.29	1.67	1.09	9 days
B	0.30	2.11	0.70	10 days
C	0.54	1.10	0.89	Clear after two months
D	0.20	1.22	1.13	50 days
E	0.04	0.21	1.27	Clear after two months
Proprietary syrups				
F	0.24	0.00	1.11	—
G	0.45	1.64	0.93	—
H	0.18	1.60	0.79	—
J	0.77	2.54	0.83	—

Behaviour on Dilution.—The behaviour of commercial B.P.C. syrups on dilution with chloroform water (1 in 5) is given in the last column of the above table. Under these conditions a precipitate of phosphate may occur in a few days owing to hydrolysis of glycerophosphate. It would appear that the syrups showing the best behaviour on dilution are those which deviate most from the B.P.C. formula. The true B.P.C. syrup contains 1.6 per cent. of calcium glycerophosphate. The author considers that there seems to be no object in using 2.2 per cent. of calcium glycerophosphate in the formula and removing excess by filtration. It is recommended that the amount of calcium glycerophosphate used be reduced to 1.8 gm. per 100 c.c. of syrup, this being based upon an average of 91 per cent. monohydrated calcium glycerophosphate in commercial products. The above work was carried out in the laboratories of the British Drug Houses, Ltd.

Changes on Storage in Easton's Syrup and Syr. Ferri Phosph. Co., B.P.C.

By L. B. TIMMIS, M.Sc.TECH., A.I.C., AND NORMAN EVERS, B.Sc., F.I.C.

[ABSTRACT]

EASTON'S Syrup and similar iron preparations have been subjected to many investigations, for the most part regarding alterations during storage, but little exact knowledge is available regarding the nature of the chemical changes which occur. Easton's syrup is dealt with first, as most of the work recorded here was done thereon.

EASTON'S SYRUP

Two obvious changes very commonly observed are: (1) The colour darkens to a yellowish-brown; (2) a precipitate forms. The syrup also exhibits a regular increase in specific gravity and a decrease of optical rotation owing to inversion of sucrose by phosphoric acid. The darkening, which has been attributed to caramelisation of sugar by acid, is undoubtedly due to oxidation. The typical colour of an old syrup can be produced by the action of a small quantity of hydrogen peroxide upon fresh Easton's syrup or by bubbling air through it for a few hours. A sample of this syrup kept in an atmosphere of carbon dioxide remained practically unaltered after three weeks. The authors suggest that the brown colour which forms is due to ferric iron in solution, perhaps combined with sugar. This view is confirmed by the fact that a reducing agent (such as stannous chloride) discharges the colour. Wright, in the "Year-Book of Pharmacy" for 1893, records the identity of the deposits in Easton's syrup as amorphous ferric phosphate, and adds that "acid quinine phosphate" sometimes crystallises out, which observations are confirmed below. The authors did not find that dextrose crystallises out of the syrup, even after completion of inversion by heating, and thus conclude that Easton's syrup could not become saturated with dextrose as has been previously stated.

Deposits from Easton's syrup may be a silky mass of needle crystals, or appear as an amorphous sludge. Those examined by the authors were found under the microscope to consist of (1) needle crystals, and (2) very small, probably amorphous, bodies in various proportions. Fig. 1, from a syrup eight months after manufacture, illustrates this. The needles are readily soluble in water, while the amorphous substance is insoluble. The precipitate filtered out and drained was extracted with water on a filter. The water extract contained quinine and phosphate, and on concentrating the extract, which contained a little sugar, a syrupy residue was obtained from which needle crystals separated. Evidently the crystalline body is a phosphate of quinine, but it was not practicable to isolate it in sufficient quantity for direct analysis. "Quinine acid phosphate" would appear not to have any definite meaning, a number of different formulas representing pure quinine phosphates having been published. Various compounds may obviously be expected between a di-acid base and and a tri-basic acid. Commercial "quinine phosphate" analysed to agree closely with a formula 4(Quinine) : $3(H_3PO_4)$: $6H_2O$. By crystallising this salt from (1) water and (2) 92 per cent. alcohol products were obtained of similar appearance to the original material, but containing either more or less quinine and not agreeing with any simple formula. It seemed possible that the salt formed in Easton's syrup might be identical with that prepared some years ago by one of us from a concentrated solution of quinine and strychnine phosphates used for the preparation of Easton's syrup. The quinine was put in as sulphate, and the crystals, which were slender needles, were found on analysis to have, approximately, the composition of one molecule of quinine combined with one of phosphoric acid and one of sulphuric acid. This body melts at 78° C., and turns yellow about 100° C. On dissolving 56 gm. of quinine base in a mixture of concentrated phosphoric acid (29 c.c.) and water (150 c.c.) with gentle heat, and cooling, a genuine phosphate crystallised in needles. This melted at about 170° C., and contained a little more than one molecule of phosphoric acid to one of quinine and two molecules of water. The salt which separates from Easton's syrup may possibly be identical with this, but at present the authors are only able to state that it is a phosphate of quinine. In all the foregoing analyses the quinine was extracted and weighed as base, and the phosphoric acid was precipitated with magnesia mixture.

The water-insoluble residue, which retained its original appearance under the microscope, was found by qualitative tests to be a ferric phosphate. It was dissolved in hydrochloric acid, and the iron was estimated iodimetrically. Phosphoric acid was determined by precipitating twice as phospho-molybdate and then with magnesia mixture.

	Fe_2O_3 Per cent.	P_2O_5 Per cent.	H_2O Per cent.
Found	39.45	36.76	23.79
Required for $Fe_2O_3.P_2O_5.5H_2O$. ..	40.76	36.25	22.97 (difference).

A salt of this formula is described by Carter and Hartshone in the "Journal of the Chemical Society" (1923, p. 2,223). After removing the original precipitate

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just described the filtrate stood a further three weeks, and gave more deposit. This proved to consist of (1) a few needle crystals, and (2) a larger proportion of the amorphous bodies, some of which adhered in clusters to the needles. After another week the precipitation continued, and the deposit consisted only of the amorphous ferric phosphate. Fig. 2 is a deposit from the same syrup after it had stood in a flask for ten weeks, several crops of amorphous deposit having been taken out during the first two weeks. It will be seen that this later deposit has increased in size and is semi-crystalline in appearance. The filtered samples, kept at 37° C., continued to precipitate ferric phosphate, but after three days the deposit was crystalline. In the course of a week the crystals became much larger and

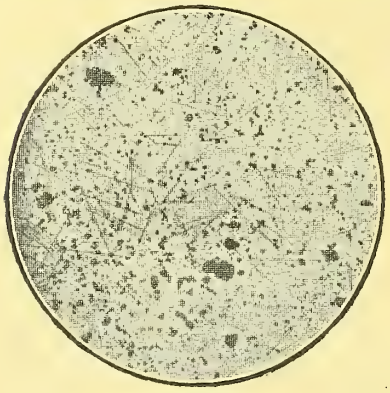

FIG. 1. × 25.

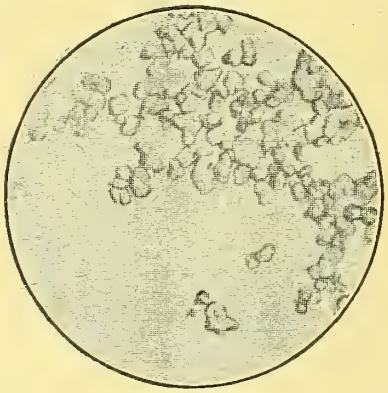

FIG. 2. × 60.

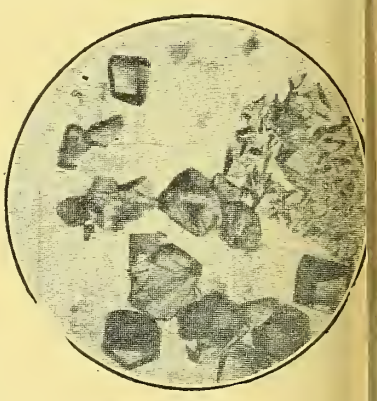

FIG. 3. × 40.

visible to the naked eye. Fig. 3 shows specimens of these crystals, which are brown in colour. Qualitative tests showed them to be a ferric phosphate.

SYR. FERRI PHOSPH. CO., B.P.C.

A large number of samples which had precipitated were examined, and in all cases the precipitate consisted of a ferric phosphate. Calcium was absent. The precipitate from a preparation about a month after manufacture showed two forms—thin hexagonal plates and a curious lens-like form. In the deposit from a large storage jar only the lens form could be seen. As with Easton's syrup, aeration for a few hours produces darkening and precipitation of syr. ferri phosph. co., whilst under carbon dioxide there is no change.

SUMMARY

From the foregoing results it is clear that both Easton's syrup and syr. ferri phosph. co. throw down ferric phosphate which is formed continuously by oxidation from the air, the colour simultaneously darkening. Easton's syrup is also liable to deposit a quinine phosphate for a short time after its manufacture.

The above work was carried out in the laboratories of Allen & Hanburys, Ltd.

A Reaction between Lead Subacetate and Phenol

By G. A. MEDLEY

[ABSTRACT]

IT was recently noted that solution of lead subacetate yielded a precipitate with an aqueous solution of phenol, and not with solution of lead acetate. As this fact does not appear to have been recorded, it was investigated further. Strong solution of lead subacetate was added to an 8 per cent. solution of phenol in water until precipitation ceased. The precipitate, after well washing with water and drying at a gentle heat, was a fine, white powder, readily soluble in organic solvents (50 per cent. alcohol, acetone, benzene, chloroform, and ether). It melted on heating, burning with a smoky flame, the fumes having the characteristic odour of phenol. On continuing ignition the product charred and finally left an orange residue containing beads of lead. Dilute acetic or nitric acid dissolved the substance, liberating phenol. With ferric chloride solution a violet coloration was produced on prolonged standing or on warming, while potassium chromate solution slowly precipitated yellow lead chromate. The foregoing reactions indicate that the precipitate is lead phenoxide. It was thought that it might be a basic phenoxide, $C_6H_5O.Pb.OH$, which phenol would dissolve; but, as this was not the case, the formula $(C_6H_5O)_2Pb$ is more likely. The precipitate dissolves readily on shaking with water containing a few drops of acetic acid, thus lending support to the view that formation of free acid by hydrolysis of lead acetate prevents the precipitation of lead phenoxide. Other phenols were also tried with similar results. Phenols with more than one free hydroxyl group gave precipitates insoluble in chloroform, and those with only one hydroxyl group yielded precipitates readily soluble in chloroform. All the phenoxides were soluble in dilute acetic acid, except that from pyrogallol.

The results are embodied in the following table :—

Phenol	Dissolved in	Action of lead acetate	Action of lead subacetate	Solubility in chloroform	Solubility in acetic acid
Phenol ..	Water	No ppt.	Whiteppt.	Soluble	Soluble
o-Cresol ..	,,	,,	,,	,,	,,
m-Cresol ..	,,	,,	,,	,,	,,
p-Cresol ..	,,	,,	,,	,,	,,
Thymol ..	,,	,,	,,	,,	,,
Catechol ..	,,	Whiteppt.	,,	Insol.	,,
Guaiacol ..	,,	No ppt.	,,	Soluble	,,
Eugenol ..	Water	,,	,,	,,	,,
Resorcinol ..	,,	,,	,,	Insol.	,,
Quirol ..	,,	,,	,, (hot soln.)	,,	,,
Pyrogallol ..	,,	Whiteppt.	Whiteppt.	,,	Insol.
Phloroglucinol	,,	No ppt.	,,	,,	Soluble
β-Naphthol ...	Boiling water	,,	,, (Boiling soln.)	Soluble	,,

In the following prescription the prescriber had requested that a clear solution be sent if possible :—

Acid carbol. liq. ... ... ♏xxx.
Liq. plumb. subacet. dil. ... ... ad ℥viij.

It was found that the best way to prevent precipitation was to add 10 minims of diluted acetic acid to the diluted solution of lead subacetate before adding the liquefied phenol. It might be argued that the addition of acetic acid converts the lead subacetate into the normal acetate, but owing to the small quantity of acetic acid used it is very doubtful whether more than a small proportion of the subacetate present is so changed. The above note is from the Pharmacy Department, University College, Nottingham.

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Note on Soft Paraffin of Commerce

By E. G. BRYANT and JOHN SPENCE

[ABSTRACT]

SOFT paraffin is an extremely variable mixture of hydrocarbons, usually described as of the paraffin series (C_nH_{2n+2}). This description is not, strictly speaking, correct, since the results below show that, in addition to paraffins, there are present considerable and variable proportions of unsaturated hydrocarbons, and possibly others of an alicyclic nature. Yellow soft paraffin varies from a homogeneous amber-coloured jelly to a reddish unctuous body showing nodules of opaque matter. Soft paraffin of commerce may be odourless or possess a distinct paraffin-like smell, and the following table shows the variation in samples of yellow soft paraffin, such as ordinarily find their way into retail pharmacy :—

YELLOW SOFT PARAFFIN

Sample	Spec. grav. 15°C.	Melting point	Iodine value
		°C.	
A	0.8333	42	42.3
D	0.8318	49	36.8
E	0.8390	48	33.3
F	0.8371	49	39.4
.. ..	0.8257	42	42.3
K	0.8182	47	30.8
L	0.8257	48	44.5
M	0.8237	47	36.7
P	0.8257	53	35.8
.. ..	0.8314	48	37.3
W	0.8275	49	38.2
X	0.8240	48	40.6
Y	0.8295	49	46.5

Variations in melting point from 42° to 53° C. are of considerable importance in dispensing; a paraffin melting at 53° C. should be banned for ophthalmic ointments.

Variation with white soft paraffin is even greater than in the yellow varieties, as the following table shows :—

WHITE SOFT PARAFFIN

Sample	Specific gravity	Melting point	Iodine value
		°C.	
B	0.8257	33	20.9
C	0.8046	51	10.27
G	0.8142	43	39.3
H	0.8142	43	25.2
N	0.8103	50	23.2
O	0.8115	48	13.7
Q	0.8162	45	30.49
R	0.8161	45	25.2
S	0.8008	49	11.2
T	0.8122	50	13.1
U	0.8161	53	14.84

The average iodine value is much lower than that of the yellow soft paraffin, but figure varies greatly (namely, from about 10 to about 40). There is again a somewhat alarming variation in the melting points (from 33° to 53° C.). These two physical constants were selected because (*a*) the iodine value is a measure of the reactivity of the substance with certain therapeutic agents with which it is exhibited, and (*b*) the melting point is a property which affects to a very considerable degree the use of the substance as an ointment base. It is suggested that in future editions of the British Pharmacopœia stricter limits should be put upon the melting point and iodine value of the official substance. Attempts to correlate the physical factors have given irregular curves from which no valuable conclusions can be deduced.

The Use of Carbon Tetrachloride in Pharmacy

By G. E. TREASE, PH.C., AND H. TINGEY

[ABSTRACT]

IN this paper carbon tetrachloride has been studied from a pharmaceutical standpoint : (*a*) As a solvent, (*b*) as a reagent for phenols.

CARBON TETRACHLORIDE AS A SOLVENT

The oleo-resins used in medicine are prepared by means of inflammable solvents such as ether, acetone and alcohol, as will be seen from the following table :—

Oleo-resin	B.P. or B.P.C.	U.S.P. VIII	U.S.P. IX & X	Fr. Codex	Ger. Ph.
Male fern	Ether	Acetone	Ether	Ether	Ether
Capsicums	Alcohol, 60 per cent.	—	Ether	—	—
Lupulin	Acetone	—	—	—	—
Ginger	Acetone	—	Ether	—	—
Pepper	Acetone	Acetone	Ether	—	—
Cubebs	—	Acetone	Alcohol	Ether and alcohol 90 per cent. equal pts.	Ether and alcohol equal parts

Carbon tetrachloride extracts were made by mixing 10 or 20 grams of ground drug with an equal weight of sand and extracting in a Soxhlet apparatus on a water bath. The time required for complete extraction of oleo-resin was about three times as long with carbon tetrachloride than with acetone or ether. The solvent was removed at as low a temperature as possible.

Drug	Ether	Carbon Tetrachloride	Acetone
(*a*) Male fern ..	7.87	7.34	12.73
(*b*) Capsicums ..	16.46	16.55	—
(*c*) Lupulin ..	51.06	50.88	50.15*
(*d*) Ginger ..	3.13*	3.03*	—
(*e*) Pepper ..	6.87*	8.07*	8.53*
(*f*) Cubebs ..	10.14*	11.45*	—

* Dried at 60° C. under pressure of 100 mm.

(*a*) *Male Fern Extracts* assayed for "crude filicin" by the B.P. method, adapted to suit the small weights of extract, gave results in the following table :—

Solvent	Wt. of extract	Crude filicin in extract	Crude filicin extracted from rhizome
	Per cent.	Per cent.	Per cent.
Ether	7.870	22.40	1.76
Carbon tetrachloride	7.344	20.97	1.54
Acetone	12.732	11.72	1.49

On treating the acetone extract with ether a reddish-brown resin remained, which was also insoluble in carbon tetrachloride amounting to 4.976 per cent., giving on subtraction 7.756, which figure corresponds fairly well with the percentage weight of ether extract. The presence of this resin reduced the filicin content of the acetone extract to about 12 per cent., and it would appear that either ether or carbon tetrachloride is preferable to acetone for the extraction of male fern. The U.S.P. requirement of not less than 6.5 per cent. of greenish ether-soluble oleo-resin from the rhizome corresponds on the above figures to a filicin content of 18.5 per cent. Ethereal extracts of male fern normally contain about 1 per cent. of acid substances of unknown character, insoluble in carbon tetrachloride. A sample of extract assaying 22.40 per cent. of crude filicin gave only 20.97 per cent when carbon tetrachloride replaced ether in the B.P. method of assay, which agrees with the percentages above.

(*b*) *Capsicum Extracts.*—The carbon tetrachloride was yellowish-brown, as compared with bright red of ethereal extract, the higher temperature necessary with carbon tetrachloride apparently causing decomposition of the colouring matter.

(*c*) *Lupulin Extracts.*—The brownish ethereal, carbon tetrachloride and acetone extracts were indistinguishable from one another.

(*d*) *Ginger Extracts.*—Both the carbon tetrachloride and ethereal extracts were reddish-brown, with an aromatic odour and pungent taste. Extractions made with a different sample of ginger yielded 5.1 per cent. to ether and 4.9 per cent. to carbon tetrachloride.

(*e*) *Pepper Extracts.*—The various extracts show little difference in appearance. As the yield from the ether

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extraction appeared to be small, a second extraction was undertaken which gave 6.86 per cent. of oleo-resin, compared with 6.87 per cent. in the first extraction.

(*f*) *Cubebs Extracts* showed a difference of about 1 per cent. between the ether and carbon tetrachloride extracts, which figures were confirmed by further extractions giving 10.12 per cent. and 11.26 per cent. of extract respectively.

Alkaloids.—Carbon tetrachloride compares unfavourably with other volatile organic liquids as an alkaloidal solvent except in the case of cocaine, of which alkaloid 31.94 gms. dissolve in 100 gms. of carbon tetrachloride at 20° C.

Iodine.—The solubility of iodine in carbon tetrachloride increases rapidly with rise in temperature, as shown in the following table :—

Temperature (approx.)	Gms. of CCl_4 required for 1 gm. of iodine	Solubility in gms. per litre
16° ..	67	23.58
25° ..	52	30.08
30° ..	46	34.22
77° ..	12	130.10

Iodised carbon tetrachloride has been recommended for skin sterilisation and as an injection (3 per cent.), but the above table shows that a solution of this strength is only possible in warm weather.

CARBON TETRACHLORIDE AS A REAGENT FOR PHENOLS

Colour reactions between halogen derivatives of methane and certain phenols in alkaline solution are well known, such tests for thymol being given in the B.P.C., U.S.P., and Fr. Codex. The B.P.C. states that "on heating a small quantity (about 1 centigram) of thymol with 1 centigram of potassium hydroxide and 1 mil. of chloroform a purple-red colour is produced." A similar test under resorcin states : "If 1 decigram be dissolved in 1 mil. of solution of potassium hydroxide, and a drop of chloroform added, the mixture on heating will assume an intense crimson colour, changing to a pale straw yellow on the addition of a slight excess of hydrochloric acid." A number of phenols tested in a similar manner to the above thymol test, and subsequent treatment of the coloured products with dilute acid, gave the following results :—

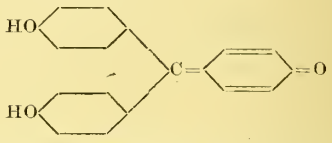
Phenolic compound	Colour	Colour after addition of acid
Phenol	Brick-red ..	Straw-yellow
o-cresol	Red	Straw-yellow
Guaiacol	Purple-red ..	Straw-yellow
Thymol	Purple-red ..	Straw-yellow
Resorcinol ..	Crimson ..	Colourless
α-naphthol	Blue	Brick-red
β-naphthol ..	Blue	Brownish-yellow

The colours from *o*-cresol, guaiacol and thymol being very similar, the test was modified by using iodoform or carbon tetrachloride in place of chloroform. With phenol and carbon tetrachloride the reaction is very slow, but is hastened with a little copper powder as catalyst. Alcohol, ether, glycerin and acetone have been used as media, and the rate of the reaction depends largely on the temperature and on the medium. The following table summarises the results obtained using acetone as a solvent medium :—

Phenolic compound	Colour with chloroform and iodoform	Colour with carbon tetrachloride
Phenol	Red	Wine-red
o-cresol	Red	Wine-red
m-cresol	Red	Wine-red
p-cresol*	Orange-red ..	No colour
Eugenol*	Reddish-brown ..	Not characteristic
Guaiacol	Purple-red	Purple-red
Thymol	Purple-red	Purple-red
Resorcinol	Crimson	Purple-red
Phloroglucinol ..	Blood-red	Orange-red
α-naphthol ..	Blue	Violet
β-naphthol* ..	Blue	Not characteristic

**Para*—substituted phenols.

It will be noticed that characteristic colours were not obtained by the action of carbon tetrachloride on the para-substituted phenols examined (marked with an asterisk). The chief product of the reaction between phenol and carbon tetrachloride is Aurin :—



Aurin, which has been used as an indicator, is the chief constituent of commercial corallin, prepared by heating together phenol, oxalic acid, and sulphuric acid. Other phenols give colours by this method, and formic acid may also be used with results as below :—

Phenolic compound	H_2SO_4 and $H_2C_2O_4$	H_2SO_4 and H.COOH
Phenol ..	Pink	Brownish-red
o-cresol ..	Crimson	Brick-red
m-cresol ..	Brick-red ..	Red
p-cresol ..	Brown	Yellow
Eugenol ..	Purple* ..	Purple*
Guaiacol ..	Red	Red
Thymol ..	Red	Red
Resorcinol ..	Blue	Orange-red
Phloroglucinol	Orange-red ..	Scarlet
α-naphthol ..	Orange-red→green ..	Green
β-naphthol ..	Red→green	Brownish-red

* Sulphuric acid alone gave a purple colour with eugenol.

The authors consider that carbon tetrachloride appears to have no advantage over other solvents for use in preparing oleo-resins apart from its non-inflammability, and that it is of little use with alkaloidal drugs. Since carbon tetrachloride gives colour reactions with a number of ortho- and meta-substituted phenols, and not with para-substituted phenols, it has in the latter respect an advantage over chloroform or iodoform as a reagent. The colours produced in the case of carbon tetrachloride are probably due to dyes of the aurin type.

An Automatic Continuous Percolator

By D. S. RATTRAY, PH.C.

[ABSTRACT]

THE apparatus described consists of a Greiner and Friedrich extraction tube (without its drug-containing vase) with its narrow inner outlet tube lengthened by attaching a piece of narrow glass tubing of the same diameter by a short rubber-tube connection (see figure on p. 259). This extension of the inner tube should project about an inch and a-half beyond the bevelled end of the outer tube. The top of the extraction tube is made air-tight by a cork perforated to take a condenser. This condenser is in turn joined by air-tight rubber connections to an air-tight water-trap bottle, similarly connected with a filter pump. Should water be employed as the menstruum the condenser may be omitted, the connection from the extraction tube going directly to the water trap.

For satisfactory working a tiny elbow tube of narrow glass tubing with arms about ¾ in. long is inserted in a small perforated cork. To use the apparatus, the drug is moistened with menstruum and allowed to swell in the usual way. A plug of glass wool is placed at the bottom of the extraction tube and the material is packed therein with the customary precautions until it is about three-quarters full. A disc of filter paper of suitable size is placed upon the surface of the drug, and the small cork, carrying the diminutive elbow tube, is inserted in the mouth of the side tube of the extractor, with its free limb pointing downwards. The object of the latter is to direct, upon the *centre* of the filter-paper cover, the stream of menstruum to be brought up the side tube by the aspirating action of the filter pump.

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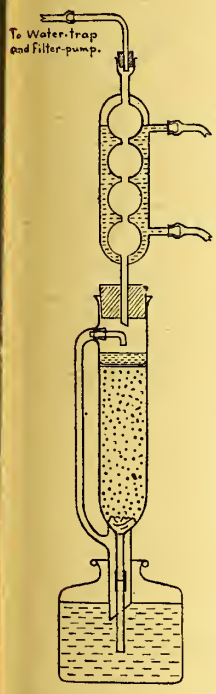
The condenser is then attached and the other connections made. The percolator is arranged so that its lower end dips into a vessel containing sufficient menstruum to cover the end of the outer, wider, tube to a distance of an inch or two. Before beginning actual percolation, it is necessary to get rid of air in the interstices of the powdered drug by producing a *very slight* reduction of pressure by means of a filter pump. The solvent should be made to rise slowly and simultaneously at an equal rate in both the side tube and through the drug, expelling air upwards from its interstices. A hasty increase of pressure reduction will cause flooding through the side tube and obviously entrap air in the middle portion of the drug, a condition which makes complete exhaustion impossible.

Once the air has been thus gradually and completely removed the pressure may be further reduced, but with discrimination. The solvent will then traverse the path of least resistance through the side tube. It will flow from the little elbow tube over the drug, and find its way downward through the drug and narrow outlet tube back into the receiver.

The total volume of menstruum in use is practically constant, so that the upflow of liquid in the side tube causes a fall of surface level of liquid in the receiver, until ultimately that level sinks below the highest part of the bevelling terminating the wide outer tube of the percolator. When this stage is reached air enters instead of liquid, and the ascent of the menstruum ceases until percolation restores the level of liquid in the receiver to a point at which it again covers the air inlet, when the flow of the menstruum recommences. In actual practice, by clamping the percolator in a suitable stand, the point at which this occurs may be so adjusted by trial, raising and lowering the percolator, that the flow becomes practically continuous, and the layer of menstruum above the drug can be kept of a constant depth. Excessive reduction of pressure should not be used, or frothing may occur, and percolation will be either hindered or made impossible. The reduction of pressure to be aimed at is that which is just sufficient to raise the menstruum at the rate corresponding to percolation. When this is attained percolation will go on continuously, with little or no further attention, until the drug is exhausted, or—in the last stage of a re-percolation process—the menstruum becomes saturated.



The Electrolytic Determination of Arsenic in Chemicals

By NORMAN EVERS, B.Sc., F.I.C.

THE method at present official in the British Pharmacopœia for the determination of arsenic is a modification of the Gutzeit method, using zinc and hydrochloric acid as a source of hydrogen. The present paper is based on several years' experience of an electrolytic method, consisting of passing a current through a solution of the substance in dilute sulphuric acid. The arsenic is evolved from the cathode with hydrogen in the form of arsenious hydride, which forms a stain on mercuric chloride paper in the same way as in the Gutzeit method. The apparatus, which is a modification of that described by Monier-Williams for the Marsh-Berzelius method, is illustrated in the photograph on this page. A lead beaker functions as the anode, being connected by a wire to the positive pole of the current source. This beaker contains a thin porous pot, which again surrounds a glass vessel (illustrated on the left of the photograph) open at the bottom and resting on the bottom of the porous pot. This glass vessel has two exit tubes. One of these is fitted with a rubber stopper through which passes a glass rod round

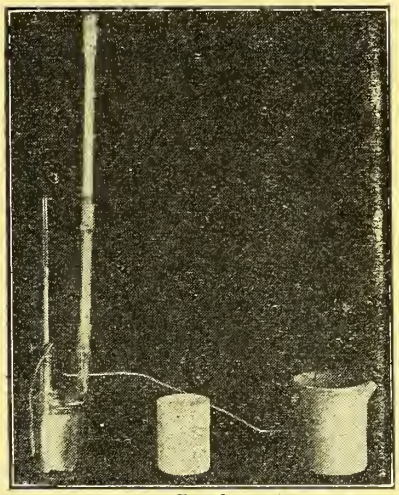


FIG. 1.

which a strip of chemically pure lead is wound to form the cathode connected by a wire to the negative terminal of the current source. The cathode is best made by cutting a piece of lead foil in the shape of Fig. 2 and rolling it round a glass rod beginning at A. It can then be slipped through the tube, unrolled, and connected up after stoppering at the top.

The other exit tube (on the right in Fig. 1) is connected by a ground-in stopper with a tube three inches long, filled with non-absorbent cotton wool. This again is connected by a second ground-in stopper with a tube which is filled with plumbised cotton wool to within 1½ in. of the end, a small plug of absorbent wool being inserted at the top. The mercuric chloride paper is fixed on as in the ordinary Gutzeit test. The modifications on Monier-Williams' apparatus consist in the more convenient method of preparing and connecting the cathode, in the arrangement of the absorption tube, which is convenient for removing the cotton wool and for cleaning, and in the abolition of the dropping funnel which is not needed for ordinary work. Sulphuric acid of 15-20 per cent. by weight, containing 0.025 per cent. cadmium sulphate, is used as the conducting liquid. The test is carried out as follows :—

The required weight of substance is dissolved or mixed in 35 c.c. of the cadmiumated sulphuric acid. The liquid is poured into the porous pot, and sufficient of the cadmiumated sulphuric acid is poured into the outer vessel, so that the level of the liquids is the same. The glass apparatus with the mercuric chloride paper in position is then placed inside the porous pot. A direct current of 3-6 amperes is passed, the potential difference between the electrodes being from 7-9 volts. The evolution of arsenic is usually complete after half an hour, but in the case of a stain being obtained the current should be allowed to flow for a further half-hour.

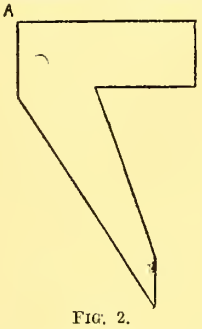


FIG. 2.

In order that the cathode may remain sensitive it must be kept clean, and after using several assays the film of cadmium which forms should be scraped off. Reversing the current ruins the cathode. The cathode cannot always be relied on to be equally sensitive if a second test is put on immediately after the first, but it regains its activity after standing in water. The cathode can be resensitised (if for any reason it has become insensitive) by washing with water

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and standing in very dilute nitric acid. Any deposit is then removed by rubbing with cotton-wool, and after thorough washing the cathode is allowed to stand in a dilute solution of cadmium sulphate for about an hour, finally being washed with distilled water.

The general method as described above is of fairly general application. Even the presence of organic matter does not adversely affect the results, and salts of other heavy metals do not require generally the previous distillation necessary in the Gutzeit method. Salts of organic acids which in the Gutzeit method require previous ignition may be treated directly. Numerous substances have been tested by the general method with and without the addition of known amounts of arsenic, and in the following instances complete recovery of the arsenic added has been effected.

Acetic Acid
Acetylsalicylic Acid
Alum
Ammonium Acetate
Ammonium Benzoate
Ammonium Citrate
Ammonium Phosphate
Ammonium Salicylate
Barbitone
Benzoic Acid
Calcium Acid Phosphate
Calcium Formate
Calcium Glycerophosphate
Calcium Hydroxide
Calcium Lactate
Calcium Phosphate
Citric Acid
Copper Sulphate
Dextrose
Ferric Ammonium Citrate
Ferric and Quinine Citrate
Ferric Citrate
Glucose
Glycerin
Glycerophosphoric Acid
Lactic Acid
Lithium Benzoate
Lithium Citrate
Lithium Hippurate
Lithium Salicylate
Lithium Sulphate
Liq. Potassæ
Magnesium Oxide
Magnesium Sulphate
Methylene Blue
Phosphoric Acid
Potassium Acetate
Potassium Benzoate
Potassium Bisulphate
Potassium Bitartrate
Potassium Citrate
Potassium Formate
Potassium Glycerophosphate
Potassium Hydroxide
Potassium Phosphate
Potassium Salicylate
Salicylic Acid
Sodium Acetate
Sodium Barbitone
Sodium Benzoate
Sodium Bisulphate
Sodium Citrate
Sodium Formate
Sodium Glycerophosphates
Sodium Hippurate
Sodium Hydroxide
Sodium Acid Phosphate
Sodium Phosphate
Sodium Potassium Tartrate
Sodium Salicylate
Sodium Sulphate
Sodium Tartrate
Sulphur
Tartaric Acid
Zinc Oxide
Zinc Stearate
Zinc Sulphate

Special Methods of Preliminary Treatment

Halogen Salts.—The evolution of the halogen during the electrolysis prevents the direct application of the electrolytic method. This may be prevented by using in the *outer* chamber (between the porous pot and the lead beaker) a 10 per cent. solution of sodium thiosulphate (instead of the cadmiumated sulphuric acid) to absorb the halogen. Good results are obtained, but slight precipitation of sulphur occurs in the outer chamber, which can be readily washed out.

Hypophosphites and Phosphites have always been a source of trouble in the Gutzeit method, which are much more readily dealt with by the electrolytic method. The weighed material is warmed in a beaker on a water-bath with 2 gms. of arsenic free potassium chlorate and 30 c.c. of cadmiumated 25 per cent. sulphuric acid. When most of the oxides of chlorine have disappeared the liquid is heated until white fumes appear. The solution, after dilution to 30 c.c. with water, is treated by the general method.

Chlorates.—The specified weight is warmed on the water-bath with 30 c.c. of cadmiumated sulphuric acid until oxides of chlorine have disappeared. Treatment is continued by the general method.

Organic Compounds.—Most organic compounds or salts of organic acids may be treated by the general method directly. It is better, however, to warm the substance with 30 c.c. of cadmiumated sulphuric acid for about ten minutes before carrying out the test. Foodstuffs should be treated in a similar manner, and if inclined to froth as with cocoa and gelatin, a few c.c.s of amyl alcohol should be run on to the surface.

Iron Salts.—Scale preparations such as ferric and ammonium citrate, ferric and quinine citrate, etc., may be tested directly by the general method. Other iron salts are best tested in the ordinary way with the addition of 2 gms. of citric acid to keep the electrode clean.

Manganese Salts may be treated in the same way as iron salts.

Bismuth Salts.—A bulky precipitate of oxysulphate prevents bismuth salts being directly treated, and they must be distilled as in the present official method.

Nitrates.—Before electrolysis the nitric acid must be removed by two evaporations with sulphuric acid, as in the present official method.

Carbonates.—The carbon dioxide must be first driven off by treating the prescribed weight with 30 c.c. cadmiumated sulphuric acid in the presence of a few drops of bromine water.

The above methods have all been tested quantitatively by the addition of known amounts of arsenic, with complete recovery in all cases. The electrolytic method of arsenic assay is generally more convenient and more accurate than the zinc and hydrochloric acid method, where a large number of determinations have to be carried out. There are, perhaps, objections to its adoption as an official method owing to the necessity of using electric current, but at the present time, when accumulators are in such general use, this objection can scarcely have much weight.

Thanks are accorded to Messrs. A. W. Middleton and F. H. Milner for suggestions and for much of the practical work, and to Allen & Hanburys, Ltd., in whose laboratories the work was carried out.

Chemical Constituents of Indian Valerian Root

By Kenneth Bullock, M.Sc., A.I.C.

[Abstract]

This paper consists of three parts :—(1) An examination of the volatile oil of Indian valerian root from bales of designated "B"; (2) a similar examination of the oil obtained by steam distillation of Indian valerian root from bales "A"; (3) continuation of the chemical examination of the oleo-resin of Indian valerian root, the first part of which was reported to the 1925 Conference.

Part I.—Volatile Oil from Indian Valerian "B"

Physical and chemical constants were : Refractive index, 1.5042; sp. gr., 0.9776 (at 19° C.); acid value, 36.6 (corresponding to 6.6 per cent. valerianic acid); ester value = 5.55 per cent., calculated as bornyl isovalerianate, and 7.07 per cent. as valerianate of a sesquiterpene alcohol. Acetyl value, 10.3 per cent, as borneol and 14.87 per cent. as sesquiterpene alcohol.

Chemical examination revealed the absence of organic bases and the presence of free valerianic acid. *Valerianic acid* was isolated by extraction of the ethereal solution of oil with 5 per cent. solution of commercial ammonium carbonate saturated with carbon dioxide, washing with ether, and shaking out with ether after acidification with 1 in 4 sulphuric acid, the yield being 4.62 grams of material distilling at 176° to 185° C., and smelling strongly of valerianic acid (which boils at 175° C.). Silver salts prepared from the first and last fractions of distillate contained 50.55 per cent. to 51.92 per cent. of silver, the theoretical amount for silver valerianate being 51.68 per cent The isolated material thus consists of practically pure valerianic acid, which existed in free condition in the original oil, as this had not been subjected to any manipulation likely to cause hydrolysis. Acetic and formic acids were not present in quantities sufficient to permit of isolation. *Free acids*, melting from 58° to 60° C. (and solidifying at 57.8° C.), were obtained by shaking the etheric solution from ammonium carbonate extraction with sodium carbonate solution (5 per cent.), three extractions giving 2.23 grams of free solid acids after purification by converting the freed acids into lead salts by their sodium soaps. Non-acidic, oily material (0.8 gm.) was obtained by a subsequent extraction with 5 per cent. potash solution. Hydrolysis with 15 per cent. alcoholic potash of the neutral oil remaining after the fractional extraction with alkalis yielded combined acids consisting probably of acetic and valerianic acids, but in amounts too small to permit isolation of the pure substances.

A sesquiterpene (boiling at 250° to 258° C.) and *sesquiterpene alcohol* (boiling point 180-185° C.) were

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isolated from the ether extract subsequent to potash hydrolysis by fractionation at low pressure (20 mm.) and purification after separation of the alcohol by conversion into potassium salt of its half-phthalic ester. A deep blue mobile oil, consisting of hydrocarbons (b.p. 252° to 255° C.), was also obtained from the residue (after removal of sesquiterpene alcohol), its colour being removable by distillation over metallic sodium.

PART II.—VOLATILE OIL FROM INDIAN VALERIAN "A"

In this examination attention was given to percentages of substances isolated, the unknown losses in preliminary experimentation preventing reliable data as regards volatile oil "B" above. The yields are those actually obtained on the Indian valerian root "A" containing 0.35 per cent. of volatile oil (351 lb. root yielding 1 lb. 3½ oz. of oil on steam distillation). Refractive index, 1.5025; sp. gr., 0.9819 at 19° C.; acid value, 51.76 (= 9.4 per cent. valerianic acid); ester value, 7.56 per cent. (calculated as valerianate of a sesquiterpene alcohol); approximate acetyl value, 4.58 per cent. (from a sesquiterpene alcohol).

Valerianic acid, together with isomeric optically active methyl-ethyl-acetic acid, comprised the ammonium carbonate extract, corresponding to 8.58 per cent. of the volatile oil.

Crude acids, equal to 2.8 per cent. of the oil, were obtained by the sodium carbonate extract, these being 90 per cent. saturated and 10 per cent. unsaturated, as determined by solubility of their zinc salts in ether. The acids consisted mainly of stearic and palmitic acids with a lower homologue also. The unsaturated acids (iodine value 145.1) are more unsaturated than oleic acid, but the quantity did not permit further examination. A further 1.54 per cent. of *combined acids* were obtained by hydrolysis with alcoholic potash of oil remaining after removal of free acids. From an examination of these it was concluded that a small quantity of formic acid occurs in the oil in a combined condition, and that the combined acids consist of valerianic acid, together with a trace of formic acid and probably a higher homologue of valerianic acid.

Crude Hydrocarbons, distilling between 135° and 140° C. at 10 mm. pressure, amounted to 67.39 per cent. of the volatile oil, and gave on purification by distillation over sodium a colourless. pleasant-smelling liquid, boiling at 265° C., consisting of a sesquiterpene or a mixture of sesquiterpenes with a similar boiling point.

Crude Alcohol, obtained by hydrolysis of half-phthalic ester, amounted to 3.3 per cent. of the volatile oil.

PART III.—EXAMINATION OF OLEO-RESIN OF VALERIAN ROOT

The petroleum spirit extractive of valerian root soluble in 70 per cent. alcohol, after successive extractions with 5 per cent. solutions of ammonium carbonate and sodium carbonate, is designated as *residual oleo-resin*, of which over 60 per cent. distils as an oil under 9 mm. pressure, between 80° and 180° C., the bulk coming over at 140° C., and about one-third remaining in the Claisen distilling flask as a semi-solid black residue. Valerianic acid is split off during this vacuum distillation, which explains the low boiling point and high acid value of the first fraction yielded on distillation of the neutral residual oleo-resin. The combined acids of this oil consisted of valerianic acid, together with a little formic acid, and a sesquiterpene (b.p. 254° to 258° C.) and sesquiterpene alcohol were isolated from the hydrolysed oil. The molecular weight of the hydrocarbon determined by depression of freezing point of benzene was 201.2, compared with 205.0 calculated for a sesquiterpene.

Petroleum spirit extract insoluble in 70 per cent. alcohol, consisting of a thick, dark green residue, which was split up by boiling with strong alcoholic potash into a fatty acid fraction and an unsaponifiable portion.

The unsaponified matter, volatile on steam distillation, consisted chiefly of sesquiterpene (being probably portion of the oil left behind owing to incomplete extraction with 70 per cent. alcohol).

The steam non-volatile, unsaponified matter was distilled *in vacuo*, the first two fractions being thick oils (second fraction, 200-240° at 7 mm.), with soft, yellow solids comprising the third (b.p. 260° at 3 mm.) and fourth fractions (b.p. 240-260° at practically absolute vacuum). The solid fractions yielded on recrystallisation from alcohol colourless satiny crystals (m.p. 67-80° C., solidifying at 67° C.), which gave combustion values approximately to hentriacontane (m.p. 68.1° C.), and it was concluded that this fraction contains some hentriacontane. The fatty acids from the above unsaponified matter were converted in methyl esters, and the latter distilled at 10 mm. pressure. The regenerated acids were split into saturated and unsaturated fractions by the lead salt ether method. Subsequent treatment of the saturated acids by zinc-salt ether process and examination of the unsaturated acids (iodine value, 139.7) by distillation *in vacuo* and fractionation at 10 mm. (into six fractions), led to the conclusion that these fatty acids consist of a mixture of arachidic, stearic, palmitic, valerianic, linolic and linolenic acids.

Quantitative results from examination of petroleum spirit extractive.—The following (actual) percentage yields are expressed on the root used, of which 210 lb. (95.4 kilograms) was extracted with petroleum spirit :—

Material Soluble in 70 per cent. Alcohol.—Ammonium carbonate extract, 0.247 per cent. (mainly valerianic acid); sodium carbonate extract, 0.15 per cent. (fatty acids); whilst 5 per cent. aqueous potash dissolved 0.025 per cent. of thick, oily, dark brown resin with pungent smell. The residual oleo-resin gave 0.344 per cent. of oil on distillation (at 3 mm. pressure), the resinous residue in the flask being a dark brown mobile oil (entirely soluble in absolute alcohol), which consists probably of oily material (but frothing and bumping preventing further distillation).

Material insoluble in 70 per cent. alcohol yielded 0.206 per cent. of unsaponified matter on extraction with ether and ethyl acetate and 0.137 per cent. of fatty acids (both calculated on original drugs). The fatty acids were methylated in the presence of sulphuric acid (instead of hydrochloric acid, as previously), and from the highest boiling fraction distilled *in vacuo* a methyl ester was obtained, which, after several recrystallisations from absolute alcohol, melted at 54° to 54.5° C., and gave combustion values agreeing with those for the methyl ester of arachidic acid (m.p. 54.5° C.).

In the above research no trace has been found of either borneol or terpenes, and it hardly seems likely that any therapeutic activity which the Indian root may possess can be attributed to borneol esters, as has been suggested in the case of the European drug.

SUMMARY

The results summarised show that the volatile oil of Indian valerian roots consists principally of a sesquiterpene hydrocarbon, accompanied by a small amount of sesquiterpene alcohol. Acids occurring in the combined state have been recognised as valerianic and formic acids. Free saturated acids (probably a mixture of stearic and palmitic acids) occur therein, accompanied by a small quantity of unsaturated acids of the oleic series. A notable quantity of valerianic acid also occurs in the free condition. The petroleum spirit extract contains in addition :—(1) Arachidic acid, (2) Hentriacontane, (3) Neutral and acidic resinous material.

The presence of linolic and linolenic acids has been detected. No trace of terpenes or of borneol was found in any of the material examined.

The above research was carried out in the Pharmaceutical department of the Victoria University, Manchester, under the direction of Professor R. B. Wild and Mr. J. Grier.

The Constants of Flax Wax

By WILLIAM HONNEYMAN, B.Sc. (LOND.), F.I.C., PH.C.

[ABSTRACT]

THE flax plant, *Linum usitatissimum*, Linn., yields, perhaps, a greater variety of useful products of first-rate importance than any other plant. Though flax wax has been known for many years, comparatively little

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chemical work has been done with it. Hodges in 1881 found that the wax alcohol present is ceryl alcohol and the wax aeid cerotic acid. Cross and Bevan confirmed this result in 1890. Little or no work has apparently been done on the analytical constants of flax wax, and this present communication was undertaken to provide such data.

Flax wax is principally associated in the plant with the fibre and with the cortical tissues, the air-dried cortex containing as much as 10 per cent., which can be extracted with a volatile solvent. In temperate climates flax is usually grown for fibre, and in warmer climates for seed. The pulling of flax plants for fibre before the seed bolls are ripe has resulted during centuries of evolution in a variety with a single long erect stem (branched only very slightly at the top, and not at all at the base), thus producing long fibres unbroken by branching. Flax for seed branches vigorously at the base, and bears many more flowers, and in consequence more seed. The fibre, however, being broken up by branching, is shorter and less valuable for textile purposes. The method of retting the flax differs considerably according to the custom of the country, but all depend on the breaking down of comparatively thin pectinous cell walls occurring between the fibre and the wood. This breaking down takes place by the action of bacteria or moulds.

Chemical Examination

The wax, prepared from several varieties of flax, examined by the usual chemical methods, gave results as follows :—

Table I

Variety of flax wax	Saponification value	Iodine value (Hanus)	Acid value	Specific gravity at 15° C.	Melting point ° C.
Irish	79.6	21.6	18.0	0.971	69.2
Courtrai	77.5	23.9	22.0	0.982	69.0
Dutch W.R. ..	82.0	28.8	18.0	0.983	69.5
Russian D.R. ..	81.4	21.8	19.5	0.985	69.8
Canadian D.R. ..	78.4	27.1	23.8	0.963	68.8
Dutch D.R. ..	83.7	23.3	17.5	0.980	67.3

W.R. = wet retted. D.R. = dry retted.

This foregoing table includes the wax from flax grown in such widely separated areas as Ireland, Belgium, Russia, Canada, and Holland, and therefore gives a fair idea of the effect of climatic conditions on the product. It also includes the three principal types of retting in use, and would be expected to illustrate any differences in composition due to the different retting systems. Under the diverse circumstances the figures show remarkably good regularity, and it is clear that the composition of the wax is hardly appreciably affected by different climatie conditions or by the various methods of retting.

In the case of Irish flax wax only the following additional determinations were made : Unsaponifiable matter (and wax alcohols), 70.04 per cent. ; fatty and wax acids, 28.20 per cent. ; Reichert Meissl Number, 3.2 ; ash, 0.62 per cent. The ash consisted principally of caleium, magnesium and potassium carbonates and phosphates, and traces of iron, etc.

A portion of the sample, distilled in superheated steam, gave the following figures, which would appear to show that this treatment hydrolyses the esters : Saponification value, 70.2 ; acid value, 33.0 ; iodine value, 18.0.

The constants of five other waxes are summarised in Table II for comparison with those of flax wax. Of these, the figures for flax wax and hemp wax were determined by the author, the others are taken from Lewkowitsch.

Table II

	Saponification value	Iodine value	Acid value	Specific gravity	Melting point
Flax wax ..	78.4–83.7	21.6–28.8	17.5–23.8	0.963–0.985	67.3–69.5
Bees ,, ..	90–99	6–14	17–22	0.960–0.970	62–55
Candelilla,, ..	36–104	5	00–17.5	0.947–0.990	65–65
Carnauba,, ..	79–84	13.5	2–7	0.990–1.00	83–85
Japan ,, ..	215–230	5–9	10–25	0.970–0.995	52–53
Hemp ,, ..	101	22.5	13.6	0.977	69.1

It will be seen that flax wax eorresponds closest in these respects to beeswax, from which it is distinguished, however, by a slightly lower saponification value, a higher iodine value, and a somewhat higher melting point. Flax wax is dark green or brown in colour, according to the state of the chlorophyll present (whieh is probably determined by the process of retting). It resembles beeswax closely in character, but is slightly harder and rather more brittle. It is not, however, a brittle wax like carnauba wax. It is capable of an extremely high polish, and in this respect is superior to beeswax, due probably to its higher melting point and greater hardness. The polished film produced by flax wax is more durable than that of carnauba, on account of its greater plasticity. Flax wax would be, therefore, on account of these properties, a valuable constituent of polishing preparations. It could also replace yellow beeswax in most preparations in which the latter is used.

The experimental work described in this communication was carried out in the laboratories of the York Street Flax Spinning Co., Ltd., Belfast.

A Comparative Study of *Berberis Aristata*, DC., and other Species of *Berberis*

By G. R. A. Short, Ph.C., Ransom Research Fellow.

[Abstract]

Berberis is a drug used extensively in India as a bitter tonic and in intermittent fevers. In native practice an extract for ophthalmie use, known as "Rusot," is prepared from various species of *Berberis*, chiefly *Berberis aristata*, DC., *B. asiatica*, Roxb., and *B. Lycium*, Royle. The stem of *Berberis aristata*, DC., was included in the 1900 Indian and Colonial Addendum to the British Pharmaeopœia, and was subsequently added together with its tincture to the British Pharmacopœia of 1914. The descriptions given therein and in the works of reference will not serve to distinguish the stem of *B. aristata*, DC., from that of other species of *Berberis*, and it was considered desirable to endeavour to discover the characters by which it might be definitely recognised. Previous knowledge of the subject is well summed up in the American Pharmaceutical Association's "Report of Committee on Drug Market, 1913," that : "No one yet knows whieh speeies ought to be used, nor how to identify it if he did." In a paper communicated by the author to the Conference in 1925 it was shown that *Coscinium* has been imported as *B. aristata*. Hartwich (1897) in the Proceedings of the American Pharmaceutieal Association describes under the name of *Berberis aristata* a bark agreeing in all particulars with that of *Coscinium*.

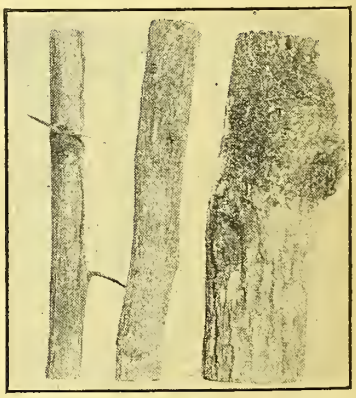

Fig. 1.—*Berberis aristata*, DC.—Three typical specimens of Berberis. All ½. Showing a young stem with spines still attached, an older stem (about 4 years) in which the spines have completely exfoliated, and a specimen about 9 years old, exhibiting a growth of moss and lichen.

Berberis occurs commercially in fairly straight pieces varying in diameter from about 1 to 4.5 cms., covered

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with a greyish-brown cork. The surface of the smaller stems exhibits longitudinal wrinkles and also the remains of spines, while the older pieces are furrowed irregularly and bear the scars of lateral branches. The cork is frequently overgrown with moss and lichens. Internally the stem is of a greenish-yellow colour when freshly cut, this colour gradually changing on exposure to the air to a cinnamon-brown. During drying, the larger stems split radially to varying depths, which frequently reach down to the pith. The transverse section shows a narrow ring of phloem which is of a dark greenish-yellow colour, and is traversed by numerous narrow, medullary rays. The wood is radiate, but the wedges are very narrow, and the whole is marked with fairly distinct annual rings. In the centre is a small lignified pith varying in diameter from 2.5 to 5.0 mm., the central portion being of a lighter colour than the surrounding tissues. Fig. 1 shows the macroscopical characters of the drug.

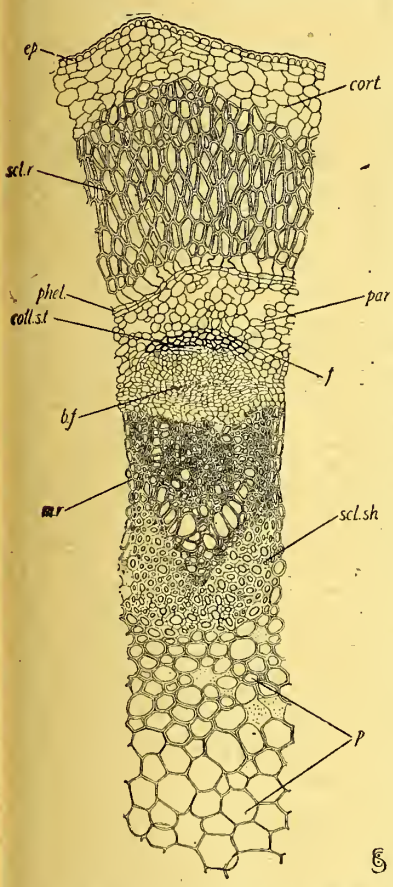

FIG. 2.—*Berberis aristata*, DC.—Stem 3.25 mm. in diameter. Transverse section. *b.f.*, bast fibres; *coll.st.*, collapsed sieve tissue; *cort.*, cortex; *ep.*, epidermis; *f.* crescent of pericyclic fibres; *m.r.*, medullary ray; *p.*, pith; *par.*, lacunous pericyclic parenchyma; *phel.*, phellogen; *scl.r.*, sclerenchymatous ring of the pericycle; *scl.sh.*, sclerenchymatous sheath.

The authentic material used in this research was supplied by Mr. R. N. Parker, of the Forest Research Institute, Dehra Dun, and consisted of stems (preserved in alcohol) of *Berberis aristata* and of *B. Chitria*, *B. asiatica*, and *B. Lycium*, and also herbarium specimens of each plant. A parcel of the dry drug was also kindly sent by Mr. T. Petch, Dept. of Agriculture, Peradeniya. Specimens of *B. vulgaris* and *B. Aquifolium* were collected by the author from plants growing in this country. The herbarium specimen of *B. aristata* was submitted to Dr. Briquet, of Geneva, who, after comparison with de Candolle's type plant, expressed the opinion that the specimen had been correctly named. The authenticity of *B. aristata*, *B. chitria*, *B. asiatica*, and *B. Lycium* was established also by comparison with the herbarium specimens at the British Museum (Natural History). The identity of *B. vulgaris* was confirmed by comparison with Kew Herbarium specimens.

One of the chief anatomical characteristics of the genus *Berberis* is the existence of a complete ring of fibres immediately below the cortical parenchyma (*cf.* Fig. 2), which the author concludes constitutes part of the pericycle. This exfoliates along with the tissue epidermal and cortical parenchyma on subsequent development of cork.

The stem of *Berberis aristata*, being the subject of the official monograph, is described in detail, the stems of other species of *Berberis* being studied mainly for the comparative purposes to enable determination of the diagnostic features of *B. aristata*.

Berberis aristata, DC.—Two specimens of stem were examined. The first was a one-year-old stem, about 3.25 mm. in diameter (see Fig. 2). In transverse section it exhibits an *epidermis* of cells with a fairly thick cuticle, and varying in size from 9 to 18μ in the tangential, and about 10 to 18μ in the radial direction. No hairs are present. The *cortex* consists of four to six rows of cellulose-walled cells, irregular in shape, and measuring 7 to 32μ by 15 to 45μ. In the cortex, immediately below the epidermis, a few isolated or small groups of rounded lignified cells are to be found. The *pericycle* is composed of two distinct zones; the outer portion is in the form of a complete ring of sclerenchyma immediately inside which the cork is produced, while the inner layer is parenchymatous with the exception of a crescent of fibres behind each phloem bundle.

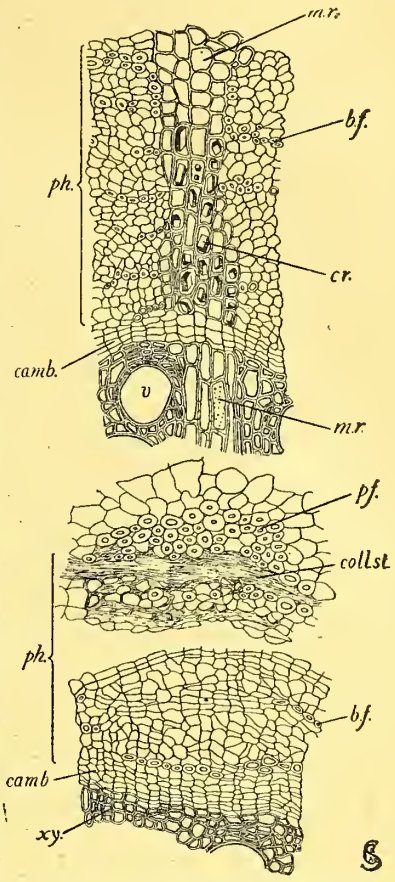

FIG. 3.—*Berberis aristata*, DC.—Stem 10 mm. in diameter. Details of transverse section, showing medullary ray, crescent of pericyclic fibres and the phloem. *b.f.*, bast fibres; *camb.*, cambium; *coll.st.*, collapsed sieve tissue; *c.r.*, crystal of calcium oxalate; *m.r.*, medullary ray; *p.f.*, pericyclic fibres; *ph.*, phloem.

The sclerenchymatous ring is composed of about eight rows of fibres possessing fairly numerous simple pits; these fibres are rather irregular in shape, but more or less polygonal in outline

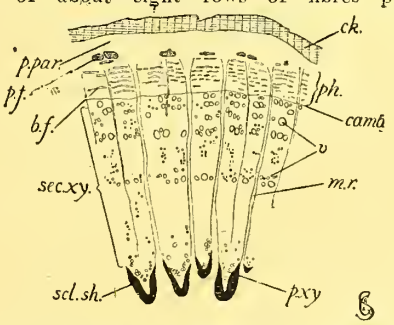

FIG. 4.—*Berberis aristata*, DC.—Stem 10 mm. in diameter. Diagrammatic drawing of a transverse section. *b.f.*, bast fibres; *camb.*, cambium; *ck.*, cork; *m.r.*, medullary ray; *p.f.*, pericyclic fibres; *ph.*, phloem; *p.par.*, pericyclic parenchyma; *p.xy.*, primary xylem; *scl.sh.*, sclerenchymatous sheath; *sec.xy.* secondary xylem; *v.*, vessels.

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and mostly elongated in the radial direction; they vary in size from 15 to 57μ by 7 to 25μ. The *phellogen* develops immediately upon the inner side of the ring of fibres in the form of a row of tangentially elongated cells. The first row of cork is composed of radially elongated cells, the radial walls of which are wavy and slightly thickened. The parenchymatous portion of the pericycle is very spongy, with about five rows of thin-walled rounded cells, varying in size from 7.5 to 30μ in either direction. The crescent of fibres behind each phloem bundle is about three cells wide in the central part; the cell walls are only slightly thickened, and the lumen is relatively large. Each *fibro-vascular bundle* consists of a half-moon shaped phloem group composed of sieve tissue and thin-walled parenchyma with a few bast fibres (usually in a single row), a many-layered cambium, and a mass of xylem. The latter is composed of fibres with a very small amount of parenchyma and vessels measuring from 10 to 32μ by

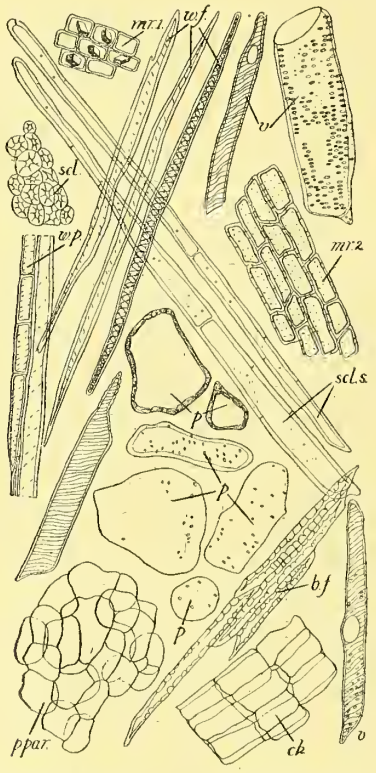

FIG. 5.—*Berberis aristata*, DC.—Tissue elements separated from stem 10 mm. in diameter. *b.f.*, bast fibres; *ck.*, cork; *m.r.l.*, group of medullary ray cells from the portion passing between the phloem groups; *m.r.2.*, portion of the medullary ray passing between xylem groups; *p.*, pith cells; *p.par.*, pericyclic parenchyma; *scl.*, stone cells from medullary ray; *scl.s.*, cells from sclerenchymatous sheath; *v.*, *vessels*; *w.f.*, wood fibres; *w.p.*, wood parenchyma.

10 to 47μ. The lower triangular portion of each xylem bundle is enclosed in a V-shaped mass of sclerenchymatous fibres, which have a fairly large lumen and are provided with a few simple pits. The pith, which constitutes about a third of the diameter of the stem, is composed of rounded and polygonal cells, those towards the outside being smaller in diameter and strongly lignified, while as the centre is approached, the cells become much larger and have thinner and only slightly lignified walls.

The second specimen examined in detail was a 2½-year-old stem (about 10 mm. in diameter) corresponding in size to small specimens of the commercial drug. In transverse section (see Fig. 3) it exhibited on the outside about twelve rows of lignified *cork* cells, the development of which had caused the whole of the cortex and sclerenchymatous ring to exfoliate. In the outer layers of the cork occasional stone cells were present. The masses of *pericyclic fibres* situated behind each phloem bundle had at this stage become completely lignified, and the cell wall of each fibre had thickened considerably. The sieve tissue in the outer part was in a collapsed condition (Keratenchyma), and the *secondary phloem* had developed as bands of bast fibres alternating with sieve tubes and bast parenchyma. The bast fibres occur in bands of from one to two cells in width, widening in places to as many as eight cells and occasionally showing isolated fibres. The *medullary rays* are from two to five cells in width. The portion which passes through the phloem is composed of rectangular cellulose-walled parenchyma, and many of these cells contain a single large prismatic crystal of calcium oxalate, or more rarely two smaller crystals. Occasionally one finds a few cells which have become lignified and have developed into typical stone cells. The remaining portion of the medullary ray which runs between two xylem bundles consists of longer rectangular cells which are lignified, free from crystals, and bear numerous simple pits on their walls. Some secondary medullary rays were present in this stem.

Tissue elements of the drug were isolated by disintegration with a mixture of chromic and dilute sulphuric acids, and the components separated by teasing out with needles (see Fig. 5). These correspond to fragments in the powder of official Berberis.

The tabular and lignified *cork* cells vary in length from 47 to 60μ, in breadth from 15 to 37μ, and height from 9 to 18μ; the majority being thickened on their inner tangential walls. The *pericycle* is represented by inner lacunous parenchyma only, consisting of rounded cells with thin cellulose walls, varying in dimensions from 15 to 40μ in any direction. The isolated groups of fibres on the inner margin of this pericyclic parenchyma are indistinguishable from bast fibres and are probably correctly regarded as belonging to the pericycle. The stem of *Berberis aristata* therefore possesses two types of fibre—one belonging to the continuous sclerenchymatous sheath, and the other to the semi-lunar groups behind the primary phloem bundles. The *vessels* are fairly small (the largest diameter being about 85μ) and bear numerous bordered pits. The smaller vessels either have a spiral thickening and no pits, or occasionally both spiral thickening and elliptical pits. The smaller vessels frequently have pointed ends and an elliptical opening in the side of the wall. The *wood fibres* are long, tapering at both ends, and bear narrow, spirally arranged pits. Some have both simple pits and a double-fine spiral thickening. The *wood parenchyma* being little developed, is only occasionally found as longitudinally elongated cells with pitted walls arranged in vertical rows, the terminal cell tapering to a sharp point. The *medullary ray* cells are of two types. Those passing through the bast consist of short rectangular parenchyma with cellulose walls and frequently contain a single prismatic crystal of calcium oxalate. The cells passing between the wood bundles are longer, lignified and provided with simple pits and are free from crystals. The *arc of sclerenchyma* on the inside of each primary xylem bundle is composed of long narrow cells, with blunt or rounded ends, each cell having usually one thin transverse wall at about its middle point. These cells bear a few very small pits. The cells of the *pith* are lignified and of two types. Those from the centre of the stem are thin-walled and slightly lignified; while the portion nearest the wood is composed of thicker-walled and strongly lignified cells and an occasional prismatic crystal of calcium oxalate is to be found in these cells. The cells vary in size from 15 to 140μ in either direction, their walls bearing numerous elliptical pits. The cells towards the centre of the pith are usually larger than the outer thick-walled cells.

Berberis Aquifolium, Pursh., a North American species, is largely cultivated in this country as an ornamental shrub. In transverse section the stem exhibits a *cork* composed of fairly thick-walled cells having wavy radial walls. During growth in thickness the cork develops longitudinal fissures which in transverse sections appear as re-entering angles and give an undulating appearance to the phellogen and youngest rows of cork

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cells. Occasional *bast fibres* (isolated or in groups of two or three) are to be found in the phloem, but *pericyclic fibres* are absent. There are no crystals of calcium oxalate or stone cells in the *medullary rays*. The *sclerenchymatous sheath* below each wood bundle is not so well developed as in the other species examined. The best character which serves to distinguish *B. Aquifolium* from the other species examined is the nature of the *pith*, which is composed entirely of thick-walled cells, with small intercellular spaces.

Berberis Asiatica, Roxb.—The *cork* cells in this species are thin-walled, with the exception of an occasional cell, which has become lignified and developed into a stone cell (see Fig. 6). A small group of *pericyclic fibres*, about three to eighteen and from one to three fibres in width) is situated behind each mass of phloem. The rows of *bast fibres* are remarkable in that they also include a few large stone cells with large lumina. The *medullary rays* contain numerous prismatic crystals of calcium oxalate and groups of stone cells. The *pith* is mostly thin-walled,

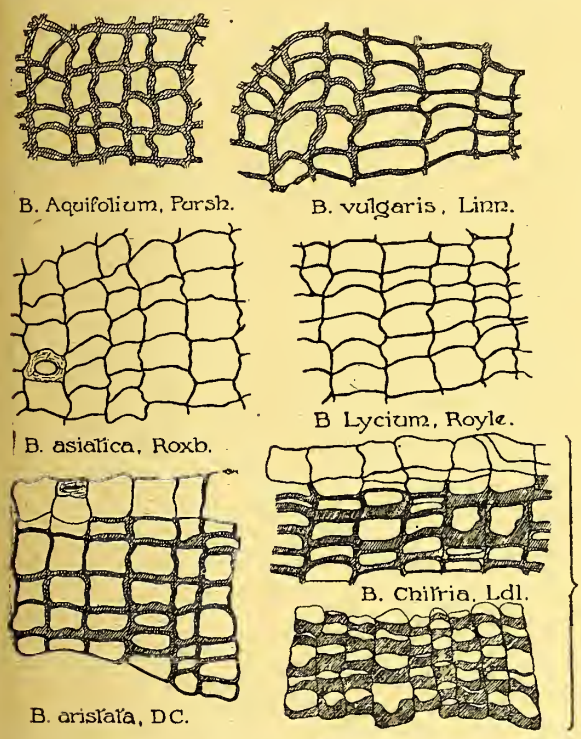


FIG. 6.—Transverse sections of the cork of the six species examined, × 200.

with a few rows of thicker-walled cells in the outer portion.

Berberis Chitria, Ldl., confirms the views of the histological examination of Lindley (1823) and C. K. Schneider (1905) that it is a distinct species. In transverse section the stem differs from that of *B. aristata* in the following particulars :—Some of the epidermal cells in the young twigs are developed in the form of short unicellular hairs, and the cortical parenchyma is composed of rounded thick-walled cells with small intercellular spaces. Older material exhibits a very characteristic *cork*, the cells of which are very strongly thickened on the inner tangential walls (see Fig. 6). In some portions of the cork the radial walls remain quite thin, while frequently they are thickened considerably. No stone cells are present in the cork. The *pericyclic fibres* behind the phloem bundles may or may not be present; when found they are in groups similar to those of *B. asiatica*.

Berberis Lycium, Royle.—This stem is rather difficult to distinguish anatomically from that of *B. asiatica*. The only constant diagnostic character is the absence of stone cells in the cork and among the bast fibres. It is, however, easily distinguished from the stem of *B. aristata* by the thin-walled cork (see Fig. 6) and the smaller groups of pericyclic fibres.

Berberis vulgaris, Linn.—This stem exhibits a fairly thin walled lignified *cork* (see Fig. 6). There are no groups of *pericyclic fibres* immediately behind the phloem bundles. In transverse section the *bast fibres* occur as isolated tangential rows alternating with wide bands of soft bast; a row of fibres may sometimes widen at intervals to a double row. The *medullary rays* are free from stone cells, and only a few crystals of calcium oxalate are present. The *pith* is thin walled, with the exception of about three or four rows in the portion nearest the wood; this portion is composed of thick walled cells which contain no calcium oxalate. The commercial bark of *B. vulgaris* was examined by G. Pinchbeck (1901), who remarked upon groups of "peculiar sclerotic cells" on the outside of the cork. These evidently consist of the remains of the ring of pericyclic fibres which had not become completely exfoliated. Probably Pinchbeck did not realise the significance of these "sclerotic cells" because he had not studied young stems in which cork had not yet developed. For the same reason, apparently, he incorrectly describes as cortex the loose pericyclic parenchyma which occurs underneath the cork.

SUMMARY

The diagnostic features of the older stems of various species of *Berberis*, such as occur in commerce, may be identified by the following macroscopical characters, which, however, are insufficient to distinguish stems of *Berberis aristata* from those of closely allied species :—

(*a*) The greyish-brown colour of the cork which in the younger stems is longitudinally wrinkled. Older specimens are furrowed irregularly externally, and are frequently overgrown with moss and lichens.

(*b*) The greenish-yellow colour of the transverse surface, when freshly cut.

(*c*) The radial splitting of the older stems on drying.

(*d*) The heavy, finely radiate wood, narrow medullary rays and fairly distinct annual rings.

The stem of *Berberis aristata* can only be distinguished microscopically from the other five species examined. The following features are diagnostic of *Berberis aristata* :—

(*a*) The large crescents of pericyclic fibres behind each primary phloem group.

(*b*) The cork composed of cells with moderately thick inner tangential walls, and amongst them an occasional stone cell.

The distinguishing characters of the remaining five species of *Berberis* are :—

Berberis Aquifolium, Pursh.—Thick-walled pith cells. The absence of stone cells and calcium oxalate in the medullary rays. The absence of pericyclic fibres behind the phloem bundles, and the only occasional occurrence of bast fibres.

Berberis asiatica, Roxb.—The thin-walled cork with an occasional stone cell. The large stone cells in the rows of bast fibres.

Berberis Chitria, Ldl.—The presence of unicellular hairs on the young twigs. The characteristic cork cells with very strongly thickened inner tangential walls, and the absence of stone cells in this tissue.

Berberis Lycium, Royle.—The thin-walled cork which is free from stone cells, and the absence of stone cells in the rows of pericyclic fibres.

Berberis vulgaris, Linn.—The absence of pericyclic fibres behind the phloem groups, and of stone cells in the medullary rays. The thin-walled pith.

Thanks are expressed to Prof. H. G. Greenish and Mr. T. E. Wallis for their valuable suggestions and help in connection with the above research.

The papers read before the Delegates' Meetings are given in the section dealing with the proceedings of the Conference.

Personalities

COUNCILLOR E. JENKINS, chemist and druggist, Faversham, has been reappointed for a period of three years a member of the District Education Committee.

COUNCILLOR C. A. CRITCHLEY, Ph.C., Blackburn, has been appointed a member of the Assessment Committee for the newly-constituted rating and valuation area.

MR. M. LINDSAY TAYLOR, son of the late Mr. G. H. Taylor, chemist and druggist, 2 Worcester Street, Kidderminster, has passed the final Law Society's examination, after gaining the degree of LL.B. at London University.

MR. W. B. GREENWOOD, Blackburn, has just completed his final examinations for the diploma of M.R.C.S. and L.R.C.P. Prior to matriculation he served his indentures as a chemist with Mr. Isherwood, Whalley Range. Mr. Greenwood is gaining professional experience in Vienna and Paris before proceeding to his degree at London University.

SCIENCE graduates in chemistry will be interested to learn that the University of London Graduates' Association have selected as their candidate for the vacancy on the Science Faculty of the Senate Dr. Robert Howson Pickard, F.R.S., D.Sc. (London), Ph.D. (Munich), F.I.C., Principal of Battersea Polytechnic, Director of the British Leather Manufacturers' Association.

MR. HUGH MACLAREN GILMORE, general manager of Sakabe & Co., Inc., toilet brush manufacturers, Osaka, Japan, is at present in London on a business visit. Mr. Gilmore is also looking after the interests of Azumi & Co., Ltd., of Osaka, manufacturers of insect powder and insecticides. Mr. Gilmore will be in London until the end of September, and communications for him may be addressed c/o THE CHEMIST AND DRUGGIST.

Deaths

APPLEYARD.—On July 24, after a brief illness, Mr. C. P. Appleyard, chemist and druggist. Mr. Appleyard had been in business for ten years at St. Andrew's Road Corner, Cambridge Town, Shoeburyness.

BUTLER.—At 2 Mount Pleasant, Norwich, on August 1, Mr. William James Gooch Butler, chemist and druggist, aged eighty-four. As a young man Mr. Butler joined the staff of A. J. Caley & Son, Ltd., Norwich, with whom he remained until he retired. He was a leading Baptist, and in 1910 was President of the Norfolk Baptist Association.

DUVAL.—At 3 St. Albans Road, London, N.W.5, on July 24, Mr. Stephen Smith Duval, late of South Grove House, Highgate, N., and of Lewis & Peat, Ltd., 6 Mincing Lane, E.C., aged eighty-four.

EVANS.—At Wavertree, St. Leonards-on-Sea, on July 30, after a long and painful illness, Jannette Hannah, eldest daughter of the late Thomas Bickerton Evans, (son of John Evans, one of the founders of Evans, Sons & Co., Liverpool), aged eighty.

MURRAY.—At Edinburgh, suddenly, on July 31, Mr. George Murray, Ph.C., Dunbar, aged sixty-nine.

PATTISON.—At Cheltenham, on July 22, Mr. Thomas Pattison, chemist and druggist, aged eighty.

SEYMOUR.—At Cowes, Mr. Edgar William Seymour, M.R.C.S., L.R.C.P., M.B., B.Ch., M.V.O., aged fifty-eight. Mr. Seymour was Surgeon Apothecary to the late Queen Victoria at Osborne.

INSURANCE DRUGS.—Sir Walter Kinnear, of the Insurance Department of the Ministry of Health, stated at the High Court of the Ancient Order of Druids that between £2,000,000 and £2,500,000 is being spent each year on drugs for Panel patients under the National Insurance Acts. The expenditure on drugs is increasing each month. The Ministry, he added, is satisfied that there is a considerable wastage of money on drugs, and unless there is some diminution in that expenditure it will be necessary to make fresh administrative arrangements to check it.

THE CHEMIST AND DRUGGIST
ESTAB. 1859
RETAIL & DISPENSING PRICE LIST
based on definite costing principles
ISSUED QUARTERLY FIFTH YEAR OF PUBLICATION

THE index for July for drugs was 141.3, showing no change from June, and 205.4 for surgical dressings, this showing a fall of one point. The changes in drug prices worthy of note are set out below. The remainder were for mostly fractional changes. The change in the index of surgical dressings was due to the reduction in the price of absorbent cotton wool.

Cost			Selling Price			
			16 oz.	4 oz.	1 oz.	1 dr.
d.	per		s. d.	s. d.	s. d.	s. d.
33	oz.	Menthol	—	—	4 10	0 9
252	lb.	Ol. menth. Jap. dementh.	—	8 10	2 4	0 4
192	oz.	Theocin.-sod. acet. ..	—	—	—	4 2
84	lb.	Tr. guaiaci ammon. ..	—	2 10	0 10	0 2

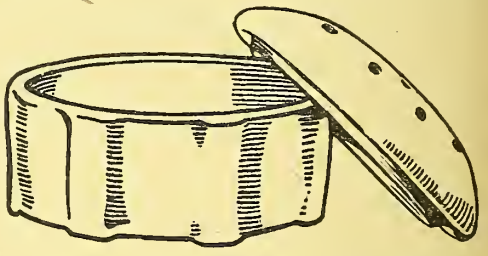
Trade Notes

PROPHYLACTIC TOOTH BRUSHES.—C. F. Marshall & Son, Devonshire Works, Devonshire Road, Hackney, London, E.9, advertise in this issue their prophylactic tooth brushes. These are made in three sizes in white or unbleached bristles.

HOME-BREWING.—Potter & Clarke, Ltd., 60, 62 and 64 Artillery Lane, London, E.1, give particulars of Dr. Thompson's ale and stout for home-brewing and packed compound extract of sarsaparilla, both of which are saleable lines at the present season.

SEAJOY PLASTERS.—The Seajoy Co., Putney, London, S.W.15, have an announcement in this number concerning Seajoy plasters, which are applied as a preventive of sea-sickness. Many testimonials show that this claim is well supported. The plaster retails at 3s.

DENTURE DISH.—Britton, Malcolm & Waymark, Ltd., 38 Southwark Bridge Road, London, S.E.1, have introduced as a novelty the "Clinbritic" denture dish.



The dish is made of white China and is fitted with a perforated lid as shown in the illustration. It retails at 1s. 6d., and showcards are supplied to advertise the article.

Information Department

INFORMATION WANTED

Postal or telephone information with respect to makers or first-hand suppliers of the undermentioned articles will be appreciated:

B/217. Restorvin tonic wine
M/317. Dr. Hall's liver salt
A/307. Eight flowers compound
L/317. Pearl Glean tooth paste
C/297. Tournesol
C/247. Rocan-hair tonic
S/207. Bulb-shaped rubber teats

Observations and Reflections

By Xrayser III

Further Consideration

of the points involved in the Privy Council's inquiry into the working of the Pharmacy Acts has proved inevitable in my case, and the same has doubtless occurred in many other instances after reading your excellent statement on the position in last week's *C. & D.* (p. 210). This statement is worthy of the careful attention of every pharmacist in Great Britain, in view of the extreme gravity of the situation. You suggest, I note, that the main object of the inquiry may be to justify a transfer of authority from one Government department to another, and I fancy there is a good deal in this. Such transfer would be in the nature of reversion to the original position, when Government control of our affairs was vested in one of H.M. Principal Secretaries of State. It was not until the Pharmacy Act, 1868, was passed that the Privy Council took over the duty of confirming and approving our by-laws and, until the coming of the Dangerous Drugs Acts, it was the Privy Council alone, among Government departments, which had any say in the matter of scheduling poisons and approving regulations concerning them.

Divided Authority

now exists, however, in this respect, and I can quite understand that this may not commend itself to the officials in either department. Since the Home Office appears to cling tenaciously to its powers under the Dangerous Drugs Acts, the Privy Council officials may feel disposed to hand over all business in respect of which they find themselves unable to act unchecked. And so the prearranged end may be that the Home Office shall take over all responsibility for controlling the supply and distribution of poisons. On the other hand, the inquiry by the Departmental Committee may be designed to show that the Privy Council is the right and proper body to continue to function as it has done for the past fifty-eight years. In the case of Northern Ireland, where we have the most recent instance of pharmaceutical legislation, the Privy Council continues to approve resolutions amending the Schedule of Poisons, but the Minister of Home Affairs has to approve resolutions dealing with matters concerning poisons. Curiously enough, he has also to approve resolutions in regard to examinations, registration, and the conditions of apprenticeship.

A Possible Outcome

of the inquiry is that the Privy Council may retain its control of the Schedule of Poisons, but with an arrangement that some medical authority shall share responsibility with the Pharmaceutical Council for the formulation of all amending resolutions. It may then also become the duty of the Home Office, as in Northern Ireland, to approve all regulations made by the Pharmaceutical Society. The change from King Stork to King Log would not necessarily be disadvantageous to chemists, provided always that the Pharmaceutical Society remains the body which *makes* all regulations. As you point out, the Society's past record of work for the protection of the public is sufficient guarantee of its fitness to continue to make and revise all necessary regulations, whether dealing with examinations, registration, apprenticeship, or the keeping, sale and dispensing of poisons. If this be subject to approval by one or other of the Government departments no one need take serious exception to the arrangement. But it will, I think, be found that important changes may be looked for, so far as the keeping or storage of poisons is concerned. Let us hope that the actual drafting of any modified regulations affecting this point, and the arrangements for enforcing them, will be left in the hands of the Pharmaceutical Society. Meanwhile it behoves every practising pharmacist to do his utmost to ensure absolute compliance with the existing regulations for the keeping, selling and dispensing of poisons.

At Blackburn Recently

the question arose at a meeting of the Insurance Committee whether a chemist's assistant, presumably not legally qualified, was justified in dispensing medicine for insured persons without the medicine being checked by a qualified person (*C. & D.*, July 24, p. 165). Two chemists who were present stated definitely that the medicine should have been so checked, whether containing poison or not. But is this the invariable practice? It may be recalled that chemists who contract for Insurance dispensing undertake that all medicine supplied for insured persons shall be dispensed either by or under the direct supervision of a registered pharmacist. What exactly is understood by the words "direct supervision"? Everyone may not interpret them alike, but it would be interesting to know how far the majority consider it necessary to see all medicine dispensed, or to check it before it is sent out.

Calumba,

though brought to Europe by the Portuguese in the seventeenth century and recommended as an alexipharmic by the Italian physician Franciscus Redi, did not come into general use till nearly a century later. On the strength, apparently, of its recommendation by Dr. Thomas Percival, it was introduced into the London Pharmacopœia in 1788. It was formerly extremely scarce and dear, selling at as much as 64s. a pound in 1781; but from the fact that in 1783 it had dropped to 6s. we may infer that the demand for it had grown rapidly and led to a greatly increased supply. It was then known as colomba root (this form of the name was retained in the Edinburgh and Dublin books until well into the nineteenth century), the Oxford English Dictionary says from a mistaken idea that it came from Colombo in Ceylon; but the Portuguese knew it from the first as Kalumbo, and this was virtually the same as its native East African name Kalumb, the final "o" being (says Pereira) mute. When first introduced here it was given in powder, in doses of from gr. 15 to 3ss., but the tincture and infusion were included in the Pharmacopœia of 1809. It was then used largely in cases of cholera and bilious diarrhœa.

The Wine of Spain

par excellence, says Mr. W. J. Todd in his authoritative "Handbook of Wine," is sherry, "a name once restricted to the products of the vineyards of Jerez de la Frontera in the province of Cadiz, but now extended so as to cover the vineyards of the South of Spain." It may be useful to add for the benefit of holders of wine licences the same writer's definition of port: "Port is now defined, by formal agreement incorporated in a Treaty of 1916, as 'a fortified wine produced in the Douro region and exported through the bar of Oporto.'" No wine not answering to this description can now be sold as port even with a qualifying name, such as "Tarragona port." It is, I suppose, the "fortifying" of port to which is due its greater popularity in this country than sherry, though the latter is fortified too. Formerly sherry was much more used; in fact, port seems to have been almost unknown till towards the close of the seventeenth century. Sherry was largely used under the name of sack (from the Spanish *seco*, dry), though this term was not confined to what Falstaff calls "sherris sack," but included Canary and other wines of a similar kind. Sherry, too, it is pretty clear, had sometimes a wider connotation than is now given to it. Luke Sherry, for instance, came from Cephalonia, and was no more Spanish than our so-called British sherries. Canary was the wine most used in pharmacy as a menstruum in olden times, but sherry, malaga, French white wine, etc., were also employed. Good sherry is, I should say, in most cases better for invalids than port, but there may be more difficulty in getting even a reasonably good sherry at a moderate price.

"AS A RULE."—A cutting from the medical advice section of a contemporary contains the following statement: "Medical men do not, as a rule, make a profit on anything which they supply to a patient." No mention is made of exceptions to the rule.

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Editorial Articles

The Advancement of Pharmacy

THE communications read at the meeting this week of the British Pharmaceutical Conference emphasise the continuous progress of the pharmaceutical sciences in this country. The address of the chairman (Mr. D. Lloyd Howard) was directed to proving that Great Britain has had a very substantial and successful fine chemical industry for over a century. The British as a nation are not given to advertising their accomplishments, but when the manufacture of synthetic chemicals was developed on the Continent it was part of the propaganda to show how the new products could replace old chemicals as regards price and quality. This seems to have left an impression on the minds of the British public that we depended entirely on the Continent for our medicinal products. Mr. Howard dealt with groups of fine chemicals, and showed that they have been standard articles of manufacture in this country for many years. Important synthetic chemicals are now made in this country, the chief being saccharin, novocaine, and salvarsan. The recent manufacture of insulin on a large scale and the synthesis of thyroxin were also referred to. The scientific communications show a welcome tendency toward specialisation in pharmaceutics, particularly in characterisation and assay of drugs, and the stability of the galenicals made therefrom. It is to be hoped that they usher in a new period of pharmaceutical advancement. The twenty-two papers, which all concern truly scientific aspects of pharmacy, can be classified as follows :—

DRUGS :	
Characteristics	3
Extraction	2
Assay	6
GALENICALS :	
Improvements	2
Variation on storage	2
B.P. REVISION	3
DISPENSING	1
CHEMICAL	1
BIOCHEMICAL	2
Total ...	22

Research for the purpose of record is perhaps the most thankless task undertaken by an investigator, but it is equally necessary to identify olden drugs as discover new remedies. In *A Comparative Study of Berberis Aristata and Other Species of Berberis* Mr. G. R. A.

Short provides data which will enable this Indian bitter to be supplied in accordance with B.P. intentions. Mr. Kenneth Bullock has continued his researches on *Indian Valerian Root*, which shows that its oil consists chiefly of a sesquiterpene and sesquiterpene alcohol, and though free valerianic acid is present in notable quantity, bornyl esters are absent. Mr. W. Honneyman has determined the *Constants of Flax Wax*, which closely resembles beeswax, but is a little harder and takes a better polish. It is extracted by solvents, and should have an economic future if produced on a commercial scale. Continuous cold extraction by solvents is the subject of a paper by Mr. D. S. Rattray, who describes a novel form of *An Automatic Continuous Percolator*, which has the advantages of a Soxhlet apparatus without boiling the solvent. *The Use of Carbon Tetrachloride in Pharmacy* for preparing oleo-resins is not promising, according to Messrs. G. E. Trease and H. Tingey, but as a reagent it gives colours with *ortho-* and *meta*-substituted phenols which are not given by the corresponding para-compounds. The assay of drugs is a never-failing feature of interest at B.P.C. meetings, and the present one excels in their practical application. Messrs. R. R. Bennett and D. C. Garratt describe a new and simple method for *Determination of Morphine in Poppy Extracts*, using isopropyl alcohol for its extraction. They also suggest standards which bring ext. papav. liq. and liq. papav. pro syr. within the Dangerous Drugs Acts. *A Comparison of Methods of Assay of Belladonna Leaves*, by Messrs. C. M. Caines and N. Evers, is decidedly in favour of the B.P. method of assay compared with those of the American or German Pharmacopœias or unofficial processes. Messrs. C. W. Cornwell and A. J. Jones show that *The Assay of Japanese Aconite Extracts* is complicated by the presence or absence of alcohol and also by the amount of ether used for extraction. In addition, there is alkaloidal decomposition, and accordingly "the whole question of the evaluation of aconite should be opened up for criticism." This point has been settled in the United States by giving preference to biological assay over chemical assay. Messrs. F. J. Dyer and W. B. Forbes found the inspiration for their paper in the *C. & D.* Progress of Pharmacy. They confirm *The Use of Diphenylamine as Indicator in Determination of Iron in Pharmaceutical Preparations*. They recommend that it be adopted in assay of pharmacopœial iron preparations. Messrs. J. F. Liverseege, H. H. Bagnall, and A. F. Lerrigo, in their invaluable communication on the *Analysis of Gregory's Powder and its Constituents* provide ample testimony for the contention in these columns that analysis of drug preparations is not so simple as it seems. For example, the magnesia used may or may not affect the water extract of rhubarb and ginger, owing to difference in its adsorptive capacity. This paper provides ample data both for comparison and reflection. Mr. C. Morton discusses the academic side of the *Dissociation and Volumetric Estimation of Cinchona Alkaloids*, the insolubility of which makes it difficult to obtain a sharp end-point during titration. It is recommended that the equivalent point be selected for titration of free bases or monohydrochlorides with brom-phenol blue as indicator. With dihydrochlorides the half-way point must be used as end-point, the indicator suggested being brom-cresol purple in conjunction with a buffer solution (containing same indicator) to serve as a colour match. Glycerophosphates and syrups containing glycerophosphates have received some needful attention. Mr. G. J. W. Ferrey, in his research on *The Analysis and Composition of Commercial Glycerophosphates*, finds that commercial glycerophosphates of sodium and magnesium vary considerably, owing to different ideas among makers on amount of water of crystallisation. Though potassium glycerophosphate solution is standardised to 50 per of anhydrous salt, 50 per cent. sodium glycerophos solution may contain down to 33 per cent. real salt a careful and complete investigation entitled *Analysis of Glycerophosphate Syrups*, Mr. G. Midd finds that the B.P.C. formula for syrup glycerophosp contains more calcium glycerophosphate than can b solved. It is recommended that the amount be re to within solubility limits. The keeping qualiti galenicals is receiving more attention. The *Chang Storage in Easton's Syrup and Syr. Ferri Phosph. B.P.C.*, have been examined by Messrs. L. B. Ti and N. Evers. Ferric phosphate formed continu by oxidation is the chief cause of both precipit and darkening in colour, though Easton's Syrup is liable to deposit a quinine phosphate. Modificati formulas are not suggested, but possibly this is next stage of this research, which is tinued from the previous Conference. *The Ab tion of Moisture by Dry Extracts* of *British Pharmacopœia* is graphically depicted Mr. Frank Wokes, who finds this can reduce alkaloidal strength below standard, as well as them unworkable for dispensing. Messrs. R. R. Be and G. Middleton have investigated *The Colour of pound Tincture of Cardamoms*, which is deci affected by its hydrogen-ion concentration. To pr a tincture of uniform colour a PH value betwee and 7.4 is necessary, and it is suggested that buff with sodium phosphate might be put forward for i sion in the next B.P., along with an increase of alc strength of menstruum from 45 per cent. to 60 per of alcohol. Pharmacopœia revision has other vot despite the lack of official encouragement. Mr. A Ware, in his review on *Astringent Drugs and the posed B.P. Revision*, contemplates a considerable r tion in official tannin containing remedies, but su tions are provided to improve all their monograp they happen to be retained. New analytical dat cutches, red gums and Malabar kino are included mainly from analytical work by Mr. C. J. Jordan. advantages of *The Electrolytic Determination of A in Chemicals*, is expounded by Mr. N. Evers, wh devised a simplification of Monier-Williams' appa Certainly the wide general application of the meth many mineral salts and organic compounds, without vious preparation, is greatly in its favour, despit necessity for an electrical current. Messrs. E. G. B and J. Spence, in their *Note on the Soft Paraff Commerce*, find that this varies somewhat, both in ing point and iodine value. They suggest that st limits for these be embodied in the future editio the British Pharmacopœia. *A Reaction between Subacetate and Phenol*, by Mr. G. A. Medley, pro a dispensing query for Conferential consideration, much as addition of a little dilute acetic acid is r mended to prevent formation of a precipitat phenoxide. The colours and solubilities in chlor or acetic acid of precipitates given by other phenol described also. The vitamin question has intrud the extent of two communications, but a great ad is that one of these relates to a colour assay for vita content of cod-liver oil, which is the most exten used vitamin preparation. A succinct summary of *Search for Colour Reactions of Vitamin-A* is provid Messrs. T. Tusting Cocking and E. A. Price. In tally it is a pharmaceutical house with a physiol laboratory that has provided a practicable mean assaying colorimetrically vitamin-A, which mean enormous saving of time in sampling and testing of liver oils. Messrs. S. G. Willmott and F. Wokes, paper on *The Vitamin Content of Tr. Limonis B.P.C.*, show that this tincture is a good sour

vitamin-B, but the price of alcohol in flavouring tinctures does not favour it replacing the extensively used yeast extract. There is a decided increase in both the number of papers and their length. Nevertheless our abstracts include all the points of significance in the communications, and their careful perusal is recommended to our readers, who cannot fail to benefit by researches which are a credit to pharmacy. It is to be hoped that they will stimulate others to add their quota to the advancement of their profession.

The discussions initiated at the delegates' meetings were not concerned with novel subjects; indeed, it is being realised that there are limitations imposed in this respect now that the Pharmaceutical Society has annexed the British Pharmaceutical Conference. Mr. Herbert Skinner dealt with the *Production of a Pharmacopœia*, and expressed interesting views as to what a national pharmacopœia should contain. The author could not very well avoid pointing out the peculiar position in this country in that pharmacists have no legal rights in the production of the British Pharmacopœia. In all other countries the necessity of entrusting the pharmaceutical work to those qualified by education is legally recognised. Mr. E. T. Neathercoat discussed the subject of *Pharmaceutical Parliamentary Representation*, which he is well qualified to do, seeing that he has practical experience of the hustings as a candidate. The desirability of the presence of pharmacists' representatives in Parliament cannot be denied, in face of the want of knowledge on technical subjects which ordinary members of Parliament display. The medical men who could help are too intent on the needs of their own profession to heed the demands of pharmacy. Mr. E. H. Simmons dealt with the *Practical Training of Apprentices*, a subject which he has made his own. It is difficult, however, to attain the ideal in an age when manufacturing has been so largely relegated to wholesale laboratories. Still, Mr. Simmons made suggestions which will appeal to the thoughtful chemist who believes in his profession and wishes to inculcate these ideas into the mind of the rising generation.

Wills

MR. HAROLD SMALLEY WILLCOCKS, Red Lodge, Hale, of H. S. Willcocks, Ltd., Manchester, chemical and metal merchants, who died on March 19, left £18,051 5s., with net personalty £1,033 8s. 2d. Probate is granted to his son, Ambrose Gordon Willcocks.

MR. ROBERT CLITHEROW JOHNSON, Ph.C., Twigmoor, Welholme Avenue, Grimsby, who died on March 18, left property of the gross value of £15,166 4s. 1d., with net personalty £1,628 18s. 6d. Probate has been granted to the widow, Mrs. Clara Johnson, to whom he left all his property absolutely.

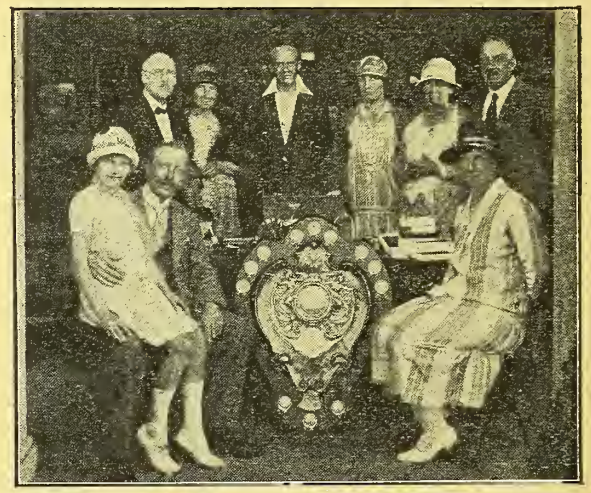
MR. ALEXANDER MILNE OGSTON, D.L., J.P., Ardoe, Banchory-Deverick, Kincardine, chairman of Ogston & Tennant, Ltd., and other companies, who died on May 12, left £376,663 0s. 8d., exclusive of large real estate. The executors are Alexander Gordon Ogston, Aberdeen, son, James Ogston, Kildrummy, brother, and John Poynter, miller, Aberdeen.

SIR HENRY MORRIS, Bart., surgeon, 42 Connaught Square, London, W.2, who died on June 14, left estate of the value of £44,768 19s. 7d., with net personalty £44,602 6s. 7d. The will has been proved by Sir William Morris Carter, C.B.E., 22 Marriott Road, Barnet, and Henry Morris Carter, of the same address, nephews, and Winifred Georgiana Carter, of 24 Gordon Street, Gordon Square, London, W.C., niece. He directs the executors to offer the portraits of himself by Ouless, R.A., to the National Portrait Gallery, and if not selected by them to the Royal College of Surgeons and the Royal Society of Medicine.

Summer Outings

North London Sports Day

The North Metropolitan Branch of the Pharmaceutical Society converted the annual social this year into a sports meeting, which was held on the grounds of S. Maw, Son & Sons, Ltd., New Barnet, on July 29. Over 120 members and their families were present. Refreshments were provided during the afternoon and evening, and an orchestra played during the day and later in the evening for dancing. The President (Mr. J. T. Walters) at the close of the day proposed a vote of thanks to Messrs. Maw for the use of their sports ground, and also to all those who had helped to make the day so successful, in particular the secretary (Mr. H. Skinner) and the M.C. (Mr. R. H. L. Watson). Mrs. Walters



MAW'S SHIELD, HELD BY THE LONDON (NORTHERN) PHARMACEUTICAL ASSOCIATION

Front (left to right): Miss Porter, Mr. J. T. Walters (President), Mrs. Walters.

Standing (left to right): Mr. H. Skinner (Secretary), Mrs. Skinner, Mr. A. F. Porter, Mrs. Porter, Mrs. Watson, Mr. R. H. L. Watson (Vice-President).

presented the prizes to the successful competitors in the following events:—

Golf (foursomes), 1, Mrs. Gibson and Mr. Rae; 2, Mrs. Downing and Mr. Collings. *Putting* (18 holes), Mrs. Downing. *Putting* (foursomes), Mrs. Walters and Mr. Downing. *Tennis* (singles), ladies, Miss E. McClean; gentlemen, Mr. H. Wright. *Egg and Spoon Race*, ladies, Mrs. Wilson; gentlemen, Mr. Gibson. *Wheelbarrow Race*, Mrs. Swanston and Mr. R. Cooper. 80 *Yards Sprint* (men over 40), Mr. R. Collings; (men under 40), Mr. G. G. Gibson. *Obstacle Race*, 1, Mr. G. Coward; 2, Mr. R. Collings. *Potato Race*, ladies, Miss D. B. Sawtell; gentlemen, Mr. Bristow. *Sack Race*, ladies, Mrs. Swanston; gentlemen, Mr. R. Cooper. *Blindfold Derby Race*, Miss Sawtell and Mr. Coward. *3-Legged Race*, Mrs. Swanston and Mr. Marshall. *Cigarette Race*, Miss Sawtell and Mr. Coward. *Musical Arms*, ladies, Mrs. Wilson; gentlemen, Mr. Pepper. *Children's Races*.—Miss Joan Carter (three prizes), Master James Deas (one prize), Master Alex Wilson (one prize), Master George Gibson (one prize).

Westminster Wisdom

Notes on Parliamentary Matters

POISON GAS PROTECTIVE MEASURES

The Prime Minister stated on August 2 that there is every reason to believe that protective measures are keeping abreast of current developments in gas warfare.

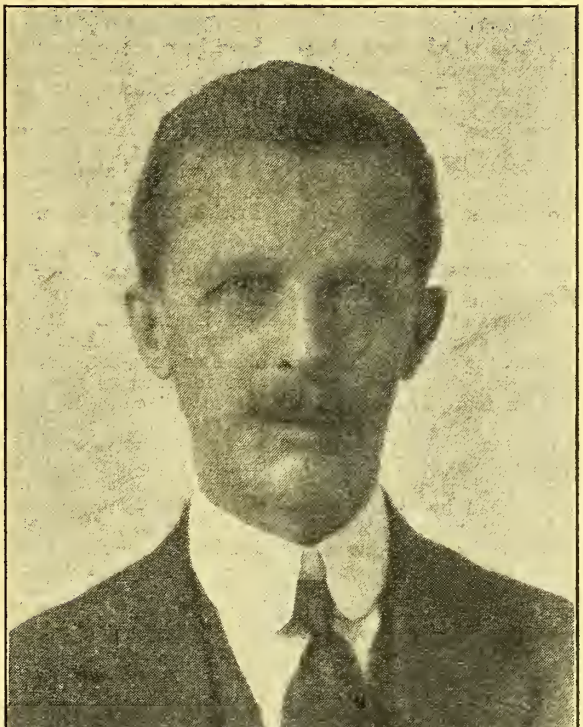
ADJOURNMENT OF PARLIAMENT

Parliament rose on August 4 for the summer recess. The autumn session will begin on November 9. If the coal-miners' dispute continues it may be necessary for Parliament to meet on August 30 and also in the last week of September to pass the Emergency Powers Regulations.

British Pharmaceutical Conference, 1926.

THE CHAIRMAN'S ADDRESS

THE chemical industries of this country, which supply the pharmacist with the multitudinous pure products which he requires for his daily work, are in many instances of great antiquity. It is, indeed, a matter of considerable difficulty to state exactly when the British fine chemical industry had its inception, but it is at any rate safe to say that it dates back well over one hundred years. In the notes which I propose to bring before you to-day I have endeavoured to trace the history of the development of some of the more important and more interesting of these manufactures, and I hope that what follows will serve to refute the statement that has so frequently been made in the past—that there was no British manufacture of fine chemical products worthy of the name prior to the Great War.



MR. D. LLOYD HOWARD, F.C.S.,
Chairman of the British Pharmaceutical Conference, 1926

One of the chief reasons for the origin of this statement and its more or less general and tacit acceptance is probably to be found in the fact that the British people as a nation have not the advertising instinct which is so strongly developed in some of our competitors. During practically the whole of the nineteenth century we produced the greater part our own requirements of pharmaceutical chemicals; but, unfortunately, owing to our national characteristics, we were not in the habit of saying very much about it, largely, perhaps, because there was not any great necessity to do so. When the production of fine chemicals by synthesis was undertaken on a large scale on the Continent, towards the close of the last century, and particularly in the early days of the present century, it not unnaturally created a great stir in the chemical world, and the interest in the new development was carefully fostered by intensive advertising. The propaganda sought, of course, to prove that the new products could with great advantage replace the old, as regards both price and quality; and it was so thoroughly carried out that the general impression left in the minds of the British public was that we depended entirely on the Continent for our medicinal products.

When the war broke out great fears were expressed on all sides that we should suffer intensely through the cutting off of Continental supplies. The lack of these was certainly inconvenient for a short time, until the British manufacturers filled up the gaps; but the very slight inconvenience served clearly to show, much to the surprise of the general public, that we really had a very extensive home industry capable of producing a large part of our requirements of pharmaceutical chemicals. Owing to the extremely varied charact of the chemical products demanded by the pha macist and the medical profession, it is n possible to deal with the fine chemical industr as a single entity. It did not (like the anilin dye industry) arise from a single discovery an develop along definite paths from that poin Many of the substances are merely the refined pr ducts of the "heavy chemical" industries—fo example, Glauber's sal phenol, sodium bicarbo ate. Others are, or were extracted from vegetab or animal materials—t alkaloids, organic acid hormones. A third cla is produced by synthes from simpler substance It is thus not possible t deal with the history British fine chemicals i logical sequence, and th must be my excuse for t somewhat disjointed cha acter and unscientif arrangement of the fac which are now put fo ward.

HISTORICAL SURVEY

Magnesium Compound —One of the earliest, not the earliest, Britis fine chemical manufactur was that of magnesiu sulphate. The Epso waters were discovered i about 1620, and their cur tive properties were widel appreciated very short afterwards. The solid sa was separated in quanti from the waters by Gre in 1695, and in 1700 and F. Moult produce magnesium sulphate fro a source which they di covered in Shooter's Hi Kent. During the earl years of the seventeent century magnesium sal were produced from s water by Hoy, and t manufacture was carri on successfully at Portsmouth, Lymington, and oth places on the South Coast until 1816, when it wa rendered unprofitable by the introduction of Henry patented process for converting dolomite into technicall useful magnesium compounds. Calcined magnesia h been made by Howards since about 1801, and it was al an early manufacture of May & Baker and Morsons.

Alum is another product the manufacture of whi dates far back in British history. At Alum Bay, the Isle of Wight, tertiary clays were used in t manufacture of alum as long ago as 1579; an aluminou deposit in Guisborough, Yorks, was also worked for t purpose in the sixteenth century, and early in t eighteenth century the Kimmeridge clay of Dorset wa utilised. A large works for extracting alum from alu shale was erected at Hurlet, Renfrewshire, about 180 and the shales of Whitby, Yorks, and Campsie, Sco land, have also been worked from early times. Alu

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was manufactured in Dublin by J. C. Gamble in about 1812, his product being made from pipeclay (obtained from Poole, Dorset) and potash (extracted from sulphur burner residues). Down to the middle of the nineteenth century potash alum only was produced, but in 1845 Peter Spence introduced the manufacture of ammonium alum, utilising the sulphate obtained from the then waste liquors from gasworks. In the same year he also discovered his well-known alum process, in which the raw material was the shale underlying certain coal seams. This discovery had the effect of reducing the time required to convert the raw material into the finished product from twelve months to one month. The process was started at Spence's works in Burgh, Cumberland, but he moved to Manchester a few years later. The extent of the early industry may be gauged from the fact that in 1869 (at which date more than half the alum made was ammonium alum) the annual production in the United Kingdom was about 8,000 tons.

Bismuth and Mercury Salts.—These widely used pharmaceutical chemicals have been largely produced in Great Britain for many years. The records in my own works show them to have been made there since about 1800, and a number of other firms have been producing them for many years—e.g., F. Allen & Sons, May & Baker, Morsons, Southalls, Tyrer, and Whiffens. It is also recorded that bismuth compounds of some undefined kind were made from impure tin produced in Cornwall early in the eighteenth century.

Changing Methods of Manufacture

Potassium Salts and Iodine.—The utilisation of the ashes of plants and seaweeds as sources of potash is very ancient. In the early days of the nineteenth century kelp was the principal source of soda for the soap-maker, and the production in Scotland exceeded 20,000 tons per annum, valued at about £20 per ton. The importation of barilla gave the first blow to the industry, and the price gradually fell to £2 per ton in 1831. In the meantime kelp had been superseded as a source of soda by the introduction of the Leblanc process, but the manufacture of potassium salts had by then begun to assume importance. The early kelps were made from "black wracks" (*Fucus* and *Ascophyllum* species); but these contained more sodium than potassium and, moreover, were burnt at such a high temperature that their potash contents were largely lost. When potassium compounds became the predominant product the "red wracks" (*Laminaria* species) took the place of the black varieties, with a consequent increase in the yield of potassium salts. The extraction of iodine from kelp was first carried out by Ure of Glasgow, and in 1841 the industry had made a promising start. By 1845 four small works were engaged in making iodine from the lyes of the soap-boilers (who then used kelp as the source of their alkali). In 1846 there were twenty makers of iodine in Glasgow; all of these treated the kelp directly, and at the same time extracted and sold the potash salts. The fall in the price of these salts following the working of the Stassfurt deposits in 1860, and the fluctuations in the price of iodine, soon caused several makers to abandon their works, and now only three works remain in Scotland. The extent of the industry is shown by the fact that in 1871 the production of iodine in the United Kingdom was 51 tons. A passing reference may be made to E. C. C. Stanford's process of distilling seaweed, instead of burning it; this process was carried on in the Outer Hebrides from 1863 for several years, but is now no longer worked. The refining of crude potassium salts and their conversion into other salts has been carried out in London since about 1800; I have records of the production of potassium chlorate and pure caustic potash between 1801 and 1805. Potassium iodide was also made before 1857, and potassium bromide (from American bromine) in about 1863, at which time the demand for the salt for medicinal purposes began to be felt.

Tartaric and Citric Acids.—The manufacture of tartaric acid from wine lees dates back more than 100 years. Firmin is known to have been making it in large quantities in Colchester in 1830, and shortly afterwards moved his factory to Millwall. It was taken over by Sir John Bennett Lawes in 1860, who continued the manufacture of the acid and also undertook the production of citric acid from lemon juice at about that time. Joseph Kemball started the manufacture of citric acid in about 1870, and in 1879 took up tartaric acid manufacture (the firm is now Kemball, Bishop & Co.). The salts of these acids, including cream of tartar and tartar emetic, are also important British products, and have for many years been made by several firms, principally in London. I also find among my own records a note of the manufacture of both these acids as far back as 1800.

Chloroform and Ether are and have been for a number of years largely produced in Great Britain. Chloroform was made in Scotland (Smiths, Duncan Flockart) as early as 1848, and by 1863 one of these firms was said to have been producing "4,000 doses" daily, a production which was nearly doubled during the next ten years. The manufacture in London also commenced in about 1850, and its output in Britain has continued, at least seven firms now producing this valuable anæsthetic. Ether, which my firm made very early in the nineteenth century, has also been manufactured by several firms continuously, and there are now at least six important British manufacturers.

Alkaloidal Production

The Alkaloids.—The British alkaloid industry is, and has been for more than a century, one of very considerable importance. It dates from the year 1821, when Morson first produced quinine sulphate and morphine in old Fleet Market, Farringdon Street, London. He was soon followed by Luke Howard, who in 1823 commenced the manufacture of quinine, and in 1827 took up the production of other alkaloids. In 1830 Morson started a new alkaloid factory at Homerton, and in 1837 T. & H. Smith, of Edinburgh, commenced the manufacture of opium alkaloids. In 1854 T. Whiffen and E. Herring started the manufacture of alkaloids and fine chemicals at Battersea, in which year they commenced the production of strychnine and its salts, and also of quinine salts, which were made by Herring's patent (1853) by a process obviating the use of alcohol. The same firm since 1859 has been making pure strychnine uncontaminated by brucine or other adulterant—a product previously unobtainable in commerce. Macfarlans, of Edinburgh, had also by that time taken up the manufacture of opium alkaloids. The succeeding years, down to about 1890, were unfruitful as regards the inception of the production of new alkaloids, but about 1896 the manufacture of caffeine was commenced in Edinburgh by Smiths, and in London by Whiffens and other firms; it is now produced by at least seven British manufacturers, as also is theobromine, the production of which had its origin in this country at about the same time. In 1890, too, the manufacture of pure nicotine and its salts for medicinal purposes was undertaken by Whiffens at Battersea, and is still one of their most interesting productions. Of the other alkaloids little was made here prior to 1899; but in that year Burroughs Wellcome & Co. started the manufacture of the salts of pilocarpine at their new Dartford works, and followed this very shortly by others, including hyoscine and the atropine group in 1902 and emetine and eserine in 1904. Other alkaloids made at Dartford at this time included apomorphine, aconitine, codeine (synthetically), colchicine, cotarnine, cocaine, homatropine, hydrastine, sparteine, etc. It may also be recorded that Smith's have been making strychnine and brucine in Scotland since 1911.

Carbolic Acid (Phenol).—Although the first gasworks started operation in this country in 1815, it was not until 1822 that the large-scale distillation of coal tar was undertaken. In that year Longstaffe and Dalston erected a tar distillery near Leith, and from that time onwards the industry rapidly expanded, till in 1834 it was being carried on extensively in Manchester and elsewhere.

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The separation of pure carbolic acid from tar oils (fraction b.p. 150°-200°) was first accomplished by Laurent in 1831, and the large-scale production of the pure product was started on the Continent by Sell in 1846. The purity of Sell's acid was evidently too much for the people of that time, since many complaints were received that his carbolic acid would not remain liquid in winter. The manufacture of pure phenol was introduced into this country by Grace Calvert and Charles Lowe, of Manchester, in about 1850; Calvert's carbolic is still a household word, and a number of other firms have taken up the manufacture, which is now of considerable importance in this country.

Animal Products

The Hormones—Adrenalin, Insulin, and Thyroxin.—The physiological importance of the suprarenal glands was realised fully eighty years ago, and numerous early attempts were made to extract their active principle. It was not, however, until nearly the close of the last century that anything approaching success was attained, and even then Abel, in America, and von Fürth, in Austria, were only able to produce impure products, though these were very highly active. The isolation of the substance in crystalline form and its christening as "adrenaline" were the work of Takamine in 1901. In the same year Aldrich ascertained its empirical formula, which was confirmed by Pauly in 1903 and by Jowett in 1904; Jowett's work also established definitely the constitution of adrenalin. Curiously the substance had been synthesised the previous year by Stolz, who, however, did not publish his work until later. His process—the production of chloroacetopyrocatechol from pyrocatechol and chloroacetic acid, and its subsequent treatment by means of methylamine and the final reduction of the product—is the basis of the process used in the manufacture of adrenalin to-day. It was first put on the market in about 1904, but was not made in this country prior to the war. Since 1915 the manufacture has been carried on in London by two firms.

The production of insulin as a British chemical industry is of such recent date that a brief reference only will suffice. The industry is one, however, of which we may justly be proud, since practically all the details of its successful manufacture were worked out in this country following collaboration with the Canadian investigators in this field, and the production now more than suffices to meet the home demands. With this achievement the names of Dale, Dudley, and Carr will ever be associated.

Although thyroxine can hardly rank at present with adrenalin and insulin as an important commercial product, it is worthy of mention in view of the recent brilliant work of another British chemist, C. R. Harington, who has lately succeeded in devising a process whereby the yield of this principle from the thyroid gland is increased twenty-five times over the amount previously obtainable by the only other practicable method (Kendall's). In addition, Harington has worked out the constitution of thyroxine and has further succeeded in effecting the synthesis of deiodothyroxine (the *p*-hydroxyphenyl ether of tyrosine), thus only leaving in doubt the position of the four iodine atoms in the molecule.

Other Natural Organic Products.—Considerations of space do not permit a detailed account of the many other organic chemicals used in pharmacy. It may, however, be mentioned that succinic acid was made in this country (from amber) as early as 1800, and benzoic acid (from gum benzoin) about 1860. Salicylic acid and its salts were also at one time made in important quantities from oil of wintergreen, but this and other manufactures have now given way before the synthetic products. Benzoic acid *ex* gum is still, however, occasionally made in small quantities to meet special demands. Other interesting early British products which are worthy of mention are cantharidin, made at least as early as 1840; aloin, made by T. & H. Smith from 1850; and salicin, by the same firm from 1872 and by Whiffens from 1876. The refining of camphor in this country also dates back well over 120 years.

Synthetics

Synthetic Products.—Although, prior to the war, manufacture of organic fine chemical products synthesis was to a very large extent a Continental m poly, there was nevertheless a beginning made in country. It is, however, curious that one of the compounds generally believed to have been made prior to 1914—I refer to saccharin—was in fact al completely manufactured abroad; the final stage, the version of *o*-benzoicsulphonamide into the imide, b the only one that was accomplished in this country, that was done under foreign control in order to a the heavy import duty on the finished product. The plete process was, however, established here very e in the war, and three British firms are now manu turing this product.

The first of the synthetic drugs, properly speaking be produced was Kairine, a hydro-derivative of methyl-8-hydroxy-quinoline; this was introduced in 1 but seems to have had a rather brief and not very i trious existence. Though it is somewhat beyond general scope of these notes, it may be of interes record the dates of introduction of some of the ea and more important synthetic drugs. Kairine was followed by antipyrine in 1883; urethane, 1885; s 1886; phenacetin, 1887; sulphonal, 1888; piperazine, 1 pyramidone, 1893; orthoform and holocaine, 1897; asp 1899; theobromine and theophylline, 1902; veronal, 1 stovaine and adrenaline, 1904; novocaine and alyp 1905; and the organic arsenic compounds, 1907.

The organic arsenic compounds, which have atta such importance of recent years in therapeutics, been known for a long time; but their medicinal v was not thoroughly appreciated until Ehrlich under his classic researches in this series, which culminate the production of salvarsan in 1910 and of neosalva in 1911. The first of the organic arsenic compound be manufactured in quantity was sodium-*p*-aminophe arsinate; this was put on the market in Germany u the name of "atoxyl" in 1907, but it is not very ge ally known that in the following year the same compo under the guise of "soamin," was made in this cou by Burroughs Wellcome & Co. Shortly after the break of war this firm, as well as Boots Pure Drug and May & Baker, took up the manufacture of varsan and neosalvarsan, which are now produce sufficient quantities in Great Britain.

Some Heavy Chemicals

It will be observed that no mention has been mad a great number of chemical products of importanc pharmacy. This does not imply that they were made in this country in quantity—in fact, many of t have a long and interesting history attached to th For example, ammonium chloride was first made in S land, from soot, in about 1750; and many of the o products, such as sodium salts, borax and boric a glycerin, hypophosphites, acetic and oxalic acids, made in quantity quite early in the nineteenth cent The pure mineral acids, too, were produced by sev firms from very early times—as examples, Howard 1800, F. Allen & Sons in 1826, and Dunn & Co. in 1 It is interesting to recall that at Allen's works in t early times oxalic acid was made by the uncomfort process of treating treacle with nitric acid, the nit fumes being allowed to escape at will.

Scant attention has been directed in these notes to great developments in our fine chemical indust during the last twelve years, since these are comparatively fresh in mind. The facts rela to the earlier manufactures, on the contrary, not by any means easy to ascertain, partly bec many of them were not published, or were lished only in ephemeral form. This must, then, be excuse for the disjointed nature of the information trust, however, it will have served to prove definitely Great Britain has had for over a century a very subs tial and successful fine chemical industry.

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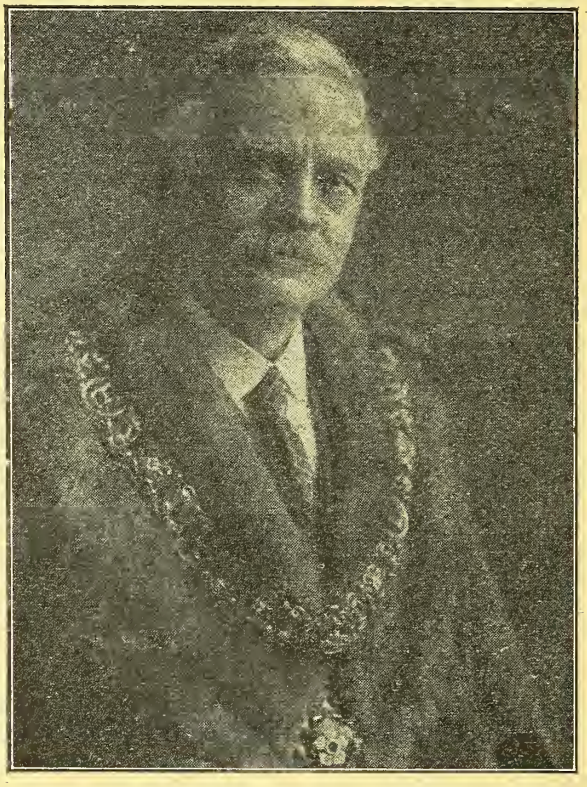
THE PROCEEDINGS

THE choice of Leicester as this year's meeting place of the British Pharmaceutical Conference makes history, in that a fresh city is added to the lengthy list of centres chosen : there is reason to think that the choice is an entirely fortunate one. As we made our way to the London terminus, the customary group of visitors from the provinces was scrutinising with unabated interest the ruins of Tussaud's Exhibition. At the station, however, a group of alert Conference visitors brought our meditations promptly back to the present. Leicester was reached in comfort almost to scheduled time—something of a feat in the circumstances; and the visitors, reinforced by some from other parts, distributed themselves among the hotels selected.

The reception given by the Mayor and Mayoress of Leicester (Alderman George Banton, J.P., and Mrs. Banton) at the County Rooms on the eve of the Conference must rank as one of the most successful of a long line of similar functions. After receiving his guests in the charming old-world building, the Mayor made a singularly happy speech of welcome, recalling, with vivid and humorous touches, some of the principal events in the long and honourable history of Leicester, with allusions to Carlyle and other authors. Mr. F. E. Bilson (President of the Pharmaceutical Society) and Mr. D. Lloyd Howard (chairman of the Conference) briefly acknowledged the welcome. Before the speeches chamber music was pleasantly discoursed by a small orchestra; and on their termination refreshments were served and dancing commenced. The friendliness implicit in the Mayor's welcome at his reception was sustained in the subsequent proceedings. Those visitors who followed the excursion programme were unanimous in their impression that every care was taken to ensure their comfort and well-being, and the votaries of science were also well shepherded. The choice of August Bank Holiday week inevitably kept some frequenters away; but the Conference may still be fairly called a representative one, even if the balance of representation was of other than a usual type. An official report of the delegates' discussion of the three addresses delivered in their section has been promised : meanwhile, it may be remarked that the speeches, short for the most part, showed as a whole a satisfactory grasp of essentials, even if, as time went on, the later contributors were apt to "spread themselves" on minor points or in side-issues. Some of the speeches rose distinctly above the level indicated.



THE MAYOR OF LEICESTER (ALDERMAN GEORGE BANTON, J.P.)

Opening Session

Tuesday Morning, August 3

The cream-and-gold decorations of the large hall of the Leicester County Rooms, the full-length portraits, and the classical atmosphere of the architecture lent distinction to the opening session of the Conference. A cool morning had succeeded the blazing heat of Monday, rendering listening more pleasant than it might otherwise have been. The chairman of the Conference (Mr. D. Lloyd-Howard) was supported at the table by the Mayor of Leicester (Alderman George Banton, J.P.), Mr. F. E. Bilson (President of the Pharmaceutical Society), Mr. Philip F. Rowsell, Mr. F. P. Sargeant, Mr. C. H. Hampshire, Mr. F. W. Crossley Holland, Mr. R. R. Bennett, Mr. F. W. Gamble, Mr. E. White, Mr. E. Saville Peck, Mr. A. E. Young, and Mr. H. N. Linstead (secretary of the Pharmaceutical Society). The Mayor of the city having briefly welcomed the Conference in felicitous terms, the chairman read his address in a shortened version, with the result that the ladies were released before eleven o'clock. One interpolation in the chairman's address (which was very cordially received by an audience of average size) is too good to be lost : Mr. Lloyd Howard remarked, when speaking of bismuth salts, that a book in his firm's library banned bismuth subnitrate once upon a time as totally unfit for internal use owing to its high arsenic content. The address, the work of an acknowledged expert, includes many hitherto unknown or little known historical facts. The moving of the vote of thanks, which used to be entrusted to the senior Vice-President, fell to Mr. Lloyd Howard's predecessor in the chair; and the only other new departure was the appearance of a desk for the readers of papers.

The MAYOR, who was introduced by the chairman, said: I had the pleasure and the honour last night to address a few words of welcome to our friends and visitors, you and your ladies. That was, however, in general terms. This morning I have the pleasure of giving you a welcome to Leicester as a Conference, and to wish, on behalf of the town, that you will have a very pleasant and profitable stay in our midst. I hope that your Conference will be useful to you and help to advance your profession. I put it last night that I was doubtful whether your calling was a trade or profession, but suppose you will put it as a profession. But to the ordinary man your calling is full of mysteries. You safeguard

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yourselves by such old-fashioned terms that we really don't know what we are going to do when we get the prescription for which we paid the doctor. (Laughter.) Perhaps it is advisable that you should maintain that secrecy. I referred last night to the antiquity of your calling, and the mysteries attached to it, and I am glad that the time has come when some of those mysteries are breaking down. I see you have the Press here—"a chiel amang ye, taking notes." (Laughter.) Whatever your debates are we hope that they will be conducted, as in times past, with due decorum. I know nothing of the particular tools that you work with; but I was delving into a book the other day, "The Chemists' Laboratory," and there I found a few terms I was familiar with, particularly the retort. (Laughter.) We know something of that. (Laughter.) I am a politician, but, of course, during my year of office I am not a politician. But, apart from that, I have taken my side. (Laughter and applause.) As politicians we know something of the retort vulgar and the retort polite. When in London I have studied early English as they have it in Billingsgate Market. (Laughter.) There they have the retort vulgar—(laughter)—and they are alarming sometimes. (Hear, hear.) Then there is the politician. An instance of this is afforded by the incident recorded of Earl Beaconsfield, who retorted on the Grand Old Man, when the latter complained that he was rather windy. To this the Earl replied that the particular statesman was intoxicated by the exuberance of his own verbosity. That was considered the retort polite, but the Grand Old Man still continued to indulge in those loquacious speeches which made him famous. I shall have pleasure in reading some of your papers; whether I shall be much wiser after that I cannot say. (Laughter.)

With regard to the future of your profession. We are beginning to wonder as to whether you are not a dying race. We have been considering what is in the minds of so many people to-day, and even yourselves, namely, the effort to discover the mysteries of the troubles from which nature suffers. The more you delve into those mysteries the nearer we shall approach the time when, as we are told, we shall live for ever. Then your industry and your profession will cease. It is a delightful prospect. (Laughter.) You will then have to find profit in the new conditions to which you will have to adapt yourselves. At all events, we hope your debates at this Conference will be profitable to yourselves and all concerned and that there will be a renewal of old friendships and acquaintanceships. You come from all parts of the kingdom; you have met before, and your interests are identical. To-day, we have so many conferences that the general public are beginning to wonder what they all mean. But that will not trouble you much. On the social side the community itself can assist, and I am sure that Leicester will do its part to make your stay here enjoyable. I hope that to-day will be bright so that the ladies who visit our flower show will enjoy it, and I hope you will enjoy yourselves. I welcome you in the name of Leicester. We are proud that you should come here. Leicester is beginning to wake up to the responsibilities of its position. We are taking more interest in these conferences, and we realise as a growing town that it is advisable for us to welcome people from all parts who should know Leicester. The best of your hosiery always comes from Leicester, and the best of your boots and shoes also come from Leicester, and the more you know of Leicester the more you will like it. Take away with you happy memories of your visit, and we shall be delighted. (Applause.)

The CHAIRMAN thanked the Mayor on behalf of the Conference for his kind and sympathetic remarks and warm welcome. "You have put your finger, sir," he said, "on one of the most important characteristics of this Conference, in alluding to the great advantage it is to have an opportunity of renewing old acquaintanceships and forming new ones. Not only is it a very pleasant and helpful thing to get new acquaintances, but the Conference gives an opportunity of meeting those in a social manner whom, in the ordinary way, we only meet on matters of business. So that the social, as well as the scientific side of the Conference, is of value. I may mention that we have a large number of scientific papers, and, I think, when they have been read they will be pronounced to be quite up to the average. (Applause.) This is the first occasion we have met in the ancient and notable city of Leicester, and I count myself very happy in that it has been made possible for me to occupy this chair on this occasion. Once more, sir, I thank you for this very kind welcome." (Applause.)

The Mayor then left, the members of the Conference standing. The chairman proceeded to deliver his address, which will be found on pp. 271 *et seq.*

VOTE OF THANKS

Mr. WHITE, proposing a vote of thanks to the chairman, said he was quite certain there would have arisen in the minds of all present a feeling of how satisfactory it was to have an expert speaking on his own subject. (Applause.) Mr. Howard had referred to the misconceptions which had arisen in recent years about the fine chemical industry fostered by newspaper reports coming from sources interested in not putting too much truth in them, or from people who did not know any better. Now Mr Howard spoke of what he knew, and four generations of truthful men had preceded him. If there was one thing outside the technical part of the business for which the name of Howard had always stood it was truth. (Applause.) The chairman had given an address written by a man about the things he knew, and that was very uncommon, for to be a successful journalist, and particularly to write technical things, it was not necessary to know too much, because it limited the writer's style, and picturesque things could not be put in. But in Mr. Howard's address they had got facts going back a hundred years or more of interest to the Conference and generations to come, and he thought they owed a debt of gratitude to the chairman for putting on record the history of a great many things which they would not find elsewhere. They might be quite certain that what they read in his paper was founded on fact, and not drawn from fiction. (Applause.)

Mr. E. SAVILLE PECK, seconding, said it was perhaps fitting that the vote of thanks had been proposed by an ex-chairman of the Conference who himself was a wholesale manufacturing chemist, and that it should be seconded by a man engaged in the practice of pharmacy. It was a great comfort for distributors of chemical products to know when they were dealing with good old firms; they could do their part with the utmost confidence. (Applause.) At Nottingham, when they decided on the amalgamation of the Conference with the Society, there was some doubt expressed as to how those who had not registered as pharmacists should be made to fit in. Mr. Howard was the first unregistered chemist to occupy the chair, and he thought those responsible for his appointment were quite justified in their decision. Not only had he given an address full of interesting scientific data, but one which would be of great service to the ordinary practising pharmacist. He (the speaker) was interested in Mr. Howard's address because of the statement that Lord Balfour made when he delivered the Messel Memorial Lecture that British scientists had done their share in increasing the knowledge available in the world in which we lived, but when it came to the practical application of scientific knowledge in the great industries based upon science he had to confess that Great Britain did not make a very good show. He ventured to suggest that if Lord Balfour would read Mr. Howard's address he would considerably modify that opinion. (Hear, hear.) He was quite sure all present would agree that the address had been able, interesting and instructive, and delivered in Mr. Howard's specially charming and modest way. (Applause.)

The CHAIRMAN, responding, said that, to be perfectly frank, he could not claim to have done all the work in connection with compiling the facts in his address, for he had received assistance from friends who were

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in a position to dig out the facts, and others connected with some of the old firms had searched in their archives for details on which he could rely. If he had placed on record matters which would be useful he would be very happy indeed. (Applause.)

Annual Report

The annual report, read by the senior general secretary (Mr. C. H. Hampshire), is summarised as follows :

The membership of the Conference now consists of all members, honorary members and student-associates of the Pharmaceutical Society, together with 20 foreign and Colonial corresponding members and 95 home corresponding members. Since the last annual meeting one new corresponding member has been elected, and 18 have retired under Rule 7. The following members have represented the Conference on the Pharmaceutical Society's Science Committee: Messrs. N. Evers, H. Finnemore, B. F. Howard and E. White. It is to be regretted that no entry was received this year for the Harrison memorial medal. The Executive hope that young pharmacists will be encouraged to come forward with original papers for this competition. The Executive desire to remind members that, should they wish to receive the "Year-Book," application is necessary before September 30, and that a charge of 2s. 6d. is made if a stiff cloth cover is required. The Executive Committee have had under their notice the submission that an educational section of the British Pharmaceutical Conference should be formed. Careful deliberation has been given to this important question, but the Committee has been unable to come to a definite decision, and the proposition has been withdrawn. The loss by death of the following corresponding members is recorded with regret: I. W. Nicholl (Belfast), E. T. Pearson (Liverpool), W. A. Jones (Liverpool), H. A. Thompson (London), A. B. Lyons (Detroit, U.S.A.), Colonel W. T. Grice, J. H. Maiden (Sydney, N.S.W.), and Professor A. R. Cushny.

Mr. Bonner (London), proposing the adoption of the report, complimented the secretaries on the lucid way in which it had been compiled and presented.

Mr. Scholes seconded, and the report was adopted.

Mr. R. R. Bennett submitted the

Treasurer's Report

The accounts for 1925 show that the income from subscriptions paid by corresponding members was £82 1s., and the revenue from the sales of the "Year-Book" was £62 2s. 10d., a total of £144 3s. 10d. The cost of the "Year-Book" was £716 18s. 1d., and general expenses amounted to £181 14s. 9d., a total of £893 12s. 10d. These figures were shown in the Pharmaceutical Society's financial statement presented at the Society's annual meeting in June. The total sum chargeable against the Society's account under the heading "British Pharmaceutical Conference" was £754 9s. Apart from the foregoing figures, the Conference account showed at the end of the financial year a balance in hand of £241 7s. 7d., included in which there is an amount of £135 11s. 9d. belonging to the Bell and Hills' Fund. The revenue credited to the Bell and Hills' Fund during 1925 was £31 14s. This amount represents dividends on the Consols hold by the Conference. The assets shown in the balance sheet are Consols to the nominal value of £1,610 (the realisable value being about £880), and cash in hand £214 7s. 7d.

Mr. T. Edward Lescher (Liverpool), proposing the adoption of the report, described the Society as the godfather of the Conference, and said that the figures which the treasurer had given showed the wisdom and value of the Conference adopting a godfather in prosperous circumstances. (Laughter.) The joining up of the Society to the Conference had, at all events, lent a great additional financial strength. He thought he could vouch for the figures of the Society being correct so far as he had had to audit them, and the report showed that the Conference was able to meet requirements and to deal with the large number of interests involved and to keep up the "Year-Book," which had always been the distinction of the Conference. He thought this was a tribute to those who had the arrangement of the Conference and were responsible for it. (Hear, hear.)

Mr. William Browne (London) seconded, and the report was adopted.

Apologies for Absence

Apologies for absence were read from Dr. D. Hooper, Mr. Blair (President of the Pharmaceutical Society of Ireland), Mr. John Keall, Mr. William Kirkby, Mr. F. Ransom, Mr. J. H. Todd (President of the Pharmaceutical Society of Northern Ireland), Mr. W. A. H. Naylor, and Mr. R. Feaver Clarke.

The chairman referred specially to Mr. Feaver Clarke, who, he said, was one of the oldest members of the Conference, and one of the most regular in his attendance. He was sure all who knew Mr. Clarke would miss him very much, and heartily sympathise with him in being prevented from attending the Conference, in which he had always been keenly interested. It had been suggested that the secretary should write to Mr. Clarke, telling him he was missed, and that they were all very sorry he was not present.

The chairman also announced that the American Pharmaceutical Association had written to say that they had appointed Dr. E. Fullerton Cook as a delegate to the Conference. Unfortunately, Dr. Cook had been prevented from coming, but that did not detract in any way from the gracefulness of the American Society's act. (Hear, hear.)

The proceedings of the Science Section were then opened.

Science Section—Tuesday Morning

The first paper presented was :—

The Colour of Compound Tincture of Cardamoms

By R. R. Bennett and S. Middleton

[Abstract appears on p. 244.]

Discussion

The Chairman referred to the research of general as well as of specific value.

Mr. T. Edward Lescher said the Conference was indebted to the authors for this paper, and the summary did not do justice to a work of first importance. Regarding metal and glass percolators, galvanised iron immediately acts on the tincture unless kept well galvanised; tinned copper is ideal. He pointed out that, in contrast to the water in the North of England, London water has a deeper alkalinity, and so gives a deeper colour to the tincture. Another cause of trouble is the alkaline or acid nature of the prescribed mixture.

Mr. J. Rutherford Hill said the Pharmacopœia tincture should be made with distilled water, so that this should not be responsible for any discrepancies. He had experimented with the tincture in ordinary and distilled water, and had found that in the former the colour was discharged and in the latter retained. Iron is not the only natural constituent of the tincture—copper is also present in the cardamom seeds. Mr. McCutcheon has suggested the use of essential oils instead of barks so as to avoid percolation. This method also gives a good tincture of uniform composition, and is free from disturbing factors. In prescriptions containing sodium bromide and potassium bromide the tincture with the former lost and with the latter retained its colour.

Mr. Briggs (Chesterfield) referred to local experience, in which, in the case of Insurance mixtures, scripts dispensed in one area were different from those in another. The difficulty was overcome by the use of distilled water being sanctioned.

Mr. Mallinson, speaking on behalf of retail pharmacists, said it was not a question of tap or distilled water, but a variation of the tincture at the source. He was disappointed that the author had not put forward some assurance of more uniform tinctures by manufacturing chemists. He hoped the B.P. formula would be altered.

Mr. Foster (Seaham Harbour) suggested that the colouring matter should be altered, e.g., by the use of a harmless aniline dye, though an aniline dye might not be satisfactory in all cases.

Mr. Butler (Leicester) referred to trouble which had

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occurred locally and had eventually been traced to the water supply.

Mr. N. EVERS (London), after congratulating the authors, said his impression was that in commercial samples variation is due to variation in cochineal (excluding metal percolators), and advocated the use of standard cochineal. He asked why the tincture should be buffered to PH 7, and why not at PH 5, which is about the same as the present tincture.

Mr. BENTLEY also referred to buffers.

Mr. FRANKLIN (Manchester) considered that no good would be done so long as cochineal was in practically universal use as a colouring agent. Regarding the employment of essential oils, he is experimenting and considers these have advantages over the ordinary tr. card. co. and make a compatible preparation.

Mr. SCHOLES (Manchester) said the Executive of the Retail Pharmacists' Union has found that tinctures from different wholesalers present certain differences. It is advisable that the tincture should be prepared so that there is no variation in the same areas if the same water is used.

Mr. BENNETT, in reply, after referring to the profitable discussion, said he was in sympathy with Mr. Mallinson, but it was difficult for him to give the assurance asked for. He hoped that the publicity given to the paper would lead to greater uniformity. Mr. Franklin's remarks are interesting, and he looked forward to further information. Regarding buffers, he pointed out that he had used sodium di-phosphate and di-sodium phosphate, which had PH 9. Mr. Evers had asked, in effect, why buffer at 7? The point was that the change in colour at about 7 is very slight; at 5 the tincture is very sensitive to changes.

The next paper was :—

A Comparative Study of *Berberis Aristata*, DC., and other Species of *Berberis*

By G. R. A. SHORT

[Abstract appears on p. 262]

DISCUSSION

The CHAIRMAN, in inviting discussion, thanked the author for his very thorough and careful investigation.

Mr. WALLIS (London) congratulated Mr. Short on work which was badly wanted. The paper was in effect a continuation of one on coscinium read by the same author at the previous Conference. There had been difficulty in obtaining authentic material: Specimens had, however, been secured from India by Professor Greenish, and had been compared by him with some at Geneva. The characters that were of value to distinguish had been decided on, and another important feature was the accuracy of the drawings.

Mr. WARE inquired whether the therapeutic action of different species had been investigated.

Mr. DYER remarked that cases had been known of coscinium being supplied for museum specimens when berberis was asked for. Wholesale houses would be grateful for Mr. Short's paper.

Mr. FINNEMORE pointed out that although the immediate value of a paper such as this might not be very apparent, its value might be great. For example, a species of *Berberis* might soon be required for the manufacture of berberine.

Mr. SHORT, in reply, said that he had not investigated the chemical content of species of *Berberis*. There was perhaps no reason for preferring *B. aristata*.

The next paper, read by Mr. N. Evers, was :—

Comparison of the Methods of Assay of Belladonna Leaves

By C. M. CAINES AND N. EVERS

[Abstract appears on p. 237]

DISCUSSION

The CHAIRMAN said large attention is being paid to the international side of medicine. A point of great importance is that the work has been done by two experienced investigators, and this gives added importance to the results.

Mr. E. WHITE announced that the work arose out of the Brussels Conference last year, where there was a great difference of opinion on the processes and standards connected with belladonna. As the result of want of agreement, a commission was appointed. The assay processes of drugs done in this country and America are the best in the world, and he hopes that this work will continue the method in use here as a standard. Leaves are being distributed, and work is being done in all countries in the hope that something satisfactory will ensue.

The next paper, read by Mr. A. J. Jones, was :—

The Assay of Extract of Aconite

By C. W. CORNWELL AND A. J. JONES

[Abstract appears on p. 238]

DISCUSSION

The CHAIRMAN characterised the paper as most valuable, and expressed the thanks of the meeting.

Mr. DEANE (Long Melford) regarded the figures given as an illustration of the fact that some processes of assay had been put into the British Pharmacopœia without much investigation and on too much assumption. In the case of separating a mixture of alkaloids, very slight differences in manipulation would provide very different results. From the manufacturer's point of view it was unsatisfactory to get such processes. With vague statements about the solubility of alkaloids, one naturally used as much of the solvent as possible.

The next paper was :—

Absorption of Atmospheric Moisture by the Standardised Dry Extracts of the British Pharmacopœia

By F. WOKES

[Abstract appears on p. 239]

There was no discussion. The chairman briefly expressed the indebtedness of the meeting to the author for his investigation of "a trouble we all experience in our own way," and announced an adjournment for luncheon.

Science Section—Tuesday Afternoon

A small number of male members of the Conference assembled shortly after 2 o'clock in the County Rooms. The first paper taken was :—

Determination of Morphine in Poppy Extracts

By C. T. BENNETT AND D. C. GARRATT

[Abstract appears on p. 235]

In the absence of the authors this paper was read by Mr. C. H. Hampshire.

DISCUSSION

The CHAIRMAN pointed out that in view of the Dangerous Drugs Acts any contribution to a standard process is valuable.

Mr. DEANE said he could confirm the authors' results regarding the B.P. process. He did not see the advantage of using isopropyl alcohol, as industrial spirit works quite well.

Mr. RUTHERFORD HILL, referring to the statement that "poppy capsules contain from 0.16 to 0.28 per cent. of morphine," asked whether the average (0.22) should be taken, as in that case the capsules would be within the D.D.A. He understood that in the case of retail sales it is usual to remove the seeds. Another point of importance is in regard to the labelling of poisons. It has never been a practice to label the capsules "Poison."

Mr. FORSTER (Seaham Harbour) said in his experience the capsules were always sold containing the seeds. He thought it was a case for going to the Home Office for exemption.

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Mr. SMITH (Stornoway) suggested that as a natural product (and not a preparation) poppy capsules were exempt.

Mr. J. R. HILL answered that this was not so.

The next paper taken was :—

The Constants of Flax Wax

By W. HONNEYMAN

[Abstract appears on p. 261]

DISCUSSION

The CHAIRMAN suggested that a possible use for this wax might be found in making motor-car varnish, if the cost was comparable with that of carnauba wax.

Mr. CROSSLEY HOLLAND inquired whether flax wax gave, when saponified, a polish as high as other waxes, or whether it lost in brilliance through having been saponified.

Mr. FINNEMORE asked whether the wax was extracted before or after retting, and suggested that a chance of working up a valuable by-product was indicated.

Dr. BRYANT (Aberdeen) mentioned the coincidence that he has been investigating esparto wax.

Replying to the points raised, Mr. HONNEYMAN said that motor-car polishes were practically all cellulose esters. The question of cost was one for the linen industry to tackle as a matter of collecting waste products; it was probable that flax wax could be obtained at about half the cost of carnauba wax. To obtain the wax before retting would spoil the spinning quality of the flax. Flax wax has been tried by at least two boot-polish manufacturers, who reported favourably. It gave an exceedingly high polish after saponification.

The next paper, read by Mr. F. J. Dyer, was :—

Diphenylamine as Indicator in the Determination of Iron Pharmaceutical Preparations

By F. J. DYER and W. B. FORBES

[Abstract appears on p. 253]

DISCUSSION

The CHAIRMAN described this as an interesting technical paper.

Mr. DEANE referred to his attempts during his apprenticeship to estimate pilula ferri and the erroneous results obtained.

Mr. BENTLEY said that it was impossible to make a satisfactory ferrous carbonate by the ordinary precipitation methods.

Mr. ADAMS asked whether the method was really more accurate than the ferricyanide one.

Mr. FORBES, in reply, said that phosphoric acid affects the indicator; by the use of phosphoric and sulphuric acids there is an end-point, but not so good. As regards the accuracy, the end-point is found more easily.

The next paper, read by Mr. R. R. Bennett, was :—

The Analysis of Glycerophosphate Syrups

By G. MIDDLETON

[Abstract appears on p. 254]

DISCUSSION

The CHAIRMAN, in inviting discussion, pointed out the value of any method that is at once quick and accurate.

Mr. A. J. JONES (London) inquired whether there was a possible confusion between soluble and insoluble salts in some of the results given.

Mr. DEANE remarked that there was a large variation in commercial glycerophosphates. Standard and uniform preparations were desirable.

Mr. WHITE asked whether glycerophosphates were of any use at all. His solution of these difficulties would be to leave them out. (Laughter.)

Mr. GAMBLE thought that Mr. White should be ruled out of order. (Laughter.) The logical outcome of such views would be that no more conferences would be wanted.

Mr. EVERS remarked that one of the makers of syrups tabulated seemed to have got near Mr. White's ideal of leaving salts out.

Mr. DYER asked whether *alpha*- and *beta*-glycerophosphates had been separately investigated.

Mr. FINNEMORE expressed the view that some work on phosphoric esters tended to show that glycerophosphates had some bearing on metabolism. Future work might show that glycerophosphoric acid and its salts were of value.

The CHAIRMAN called attention to a passage in Mr. Ferrey's paper on commercial glycerophosphates, pointing out that synthetic glycerophosphoric acid was optically inactive, a statement which might throw some light on the present problems.

Mr. BENNETT, in reply to the previous speakers, expressed regret at the absence of the author and Mr. Ferrey. The glycerophosphates of calcium, magnesium, potassium, sodium and iron were all rather indefinite compounds. The usual method for titration of the base in the first four was fairly satisfying. The salts in general were mixtures of *alpha*- and *beta*-glycerophosphates. The British Pharmaceutical Codex monograph on the iron salt needed revision. A true neutral iron glycerophosphate was insoluble; an acid salt was slightly soluble. In one sample of commercial iron glycerophosphate 23 per cent. of citric acid was found.

The next paper, read by Mr. N. Evers, was :—

Changes on Storage in Easton's Syrup and Syr. Ferri Phosph. Co., B.P.C.

By L. B. TIMMIS and N. EVERS

[Abstract appears on p. 255]

DISCUSSION

Mr. FORSTER (Seaham Harbour) described the paper as valuable and long overdue. Could authors say how to prevent or to retard the oxidation?

Mr. HONNEYMAN (Belfast) had found samples which apart from ferric phosphate contained a reasonable amount of calcium sulphate.

Mr. DEANE considered that it was too sweeping a statement to say that all changes were due to oxidation. He had found that syr. ferri phosph. co. made without cochineal soon became discoloured and thick.

Dr. BRYANT (Aberdeen) inquired if the authors had done any work on the use of glycerin instead of syrup.

Mr. FINNEMORE (London) said it did not follow that caramelisation does not occur in preparations containing iron.

Mr. EVERS, in reply, said it is possible to get calcium sulphate if the phosphoric acid contains sulphuric acid. This is, of course, the objection to the use of sulphurous acid as a preservative. It is surprising how small an amount of air is necessary to produce oxidation. He could not say if ferric phosphate is formed in the course of manufacture and slowly deposited. He had done no work on the use of glycerin.

The next paper, read by Mr. G. E. Trease, was :—

The Use of Carbon Tetrachloride in Pharmacy

By G. E. TREASE and H. TINGEY

[Abstract appears on p. 257]

DISCUSSION

The CHAIRMAN pointed out that a non-inflammable solvent would be invaluable to the manufacturer, and the paper would prove valuable as a guide.

Mr. HONNEYMAN (Belfast) said that no mention had been made of waxes. For beeswax, for example, carbon tetrachloride was most useful.

Mr. FINNEMORE (London) thought the authors should divide the paper into two, and suggested "Carbon Tetrachloride as a Solvent for Phenols" as the heading. This would facilitate reference.

Mr. DYER said that ethereal extract of male fern differs from a carbon tetrachloride extract. The alleged superiority of the Austrian extract is believed to be due to the combination of solvents.

Mr. TREASE, in reply, pointed out that the B.P. makes use of carbon tetrachloride as a solvent for fats and waxes.

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The next paper, read by Mr. A. O. Bentley, was :—

A Reaction between Lead Subacetate and Phenol

By G. Medley

[Abstract appears on p. 256]

Discussion

Mr. Gamble inquired whether the paper was to be taken as implying that the incompatibility in the prescription quoted should be avoided by adding acetic acid. It was wrong to do so without the prescriber's sanction.

Mr. Ware wondered whether a precipitate would be formed in all the conditions indicated by the author. His own experiments led him to think there would not be precipitation. Some of the complex phenols—e.g., ipecacuanhic acid and aloin—were not precipitated by neutral lead acetate.

Mr. Finnemore hoped that the author would continue his investigation, in order to clear up points which were left in doubt.

Replying on the discussion, Mr. Bentley said that the paper was suggested by an actual prescription which the prescriber desired sent out as a clear solution.

The next paper, read by Dr. E. G. Bryant, was :—

Note on Soft Paraffin of Commerce

By E. G. Bryant and J. Spence

[Abstract appears on p. 257]

Discussion

Mr. Crossley Holland inquired how Dr. Bryant arrived at the melting point. He had successfully used the following method : Mix some inert powder, e.g., bismuth or barium salt, with the paraffin to give opacity, the moment the suspended powder begins to settle the true melting point is found.

Mr. Honneyman (Belfast) said there are two kinds of paraffin derivatives. The iodine values of white paraffin vary considerably. He had used the iodine values to test if the oil will remain colourless.

Dr. Bryant, in his reply, mentioned that the method he used was a rough one—a test-tube, partly filled with paraffin, was warmed on a water bath and the temperature taken at the appropriate moment.

The next paper, read in abstract by Mr. C. H. Hampshire, was :—

The Dissociation and Volumetric Estimation of the Cinchona Alkaloids

By C. Morton

[Abstract appears on p. 235]

Discussion

Mr. Honneyman expressed a doubt whether it was good to bother with these indicators. Electrometric titration, by a simple method published in an American journal, seems to get over the difficulty with end-points.

The last paper, presented in abstract by Mr. C. H. Hampshire, was :—

Analysis of Gregory's Powder and its Constituents

By J. F. Liverseege, H. H. Bagnall and A. F. Lerrigo

[Abstract appears on p. 241]

There was no discussion, and the chairman announced that the paper of Mr. G. W. Ferrey on "Commercial Glycerophosphates" and that of Mr. K. Bullock on "Indian Valerian Root" (abstracts of which appear on pp. 251 and 260) would be taken as read. This concluded the day's proceedings of the Section.

Science Section—Wednesday Afternoon

The claims of other attractions had a manifest effect on the attendance on Wednesday afternoon, when the remaining five papers were presented. The chairman, who presided, called first on Mr. R. R. Bennett to read a paper entitled

The Search for Colour Reactions of Vitamin "A"

By T. T. Cocking and E. A. Price

[Abstract appears on p. 246]

Discussion

The Chairman pointed out that the paper represented a vast deal of research on a subject which is the most important and interesting in bio-chemistry in recent years.

Mr. Wokes (Liverpool) said that until a colorimetric test for vitamin A is proved satisfactory it is necessary to run parallel experiments, particularly as in some cases there may be another vitamin present. In the course of his experiments he had found that the moisture concentrated in the aqueous layer. He had not used the tintometer but a colorimeter, and had found that the personal factor was of great importance, and may be liable for an error of 6 to 8 per cent. He had employed toluol as a diluent with good results.

Mr. White (London) said that the colour reaction was at present on trial, and the only way to prove it reliable is to conduct feeding experiments. The Society's laboratories are about to set up vitamin-testing experiments, and if these should prove that the colour test is satisfactory it would considerably simplify the testing of cod-liver oil. It is not proved that vitamins exist. An important thing about the tests is that they would show whether the vitamins had previously been extracted from the oil, but until the experiments have been made it is hardly safe to rely on the colorimetric method.

Mr. R R. Bennett, in reply, desired to make it clear that this communication is made a little prematurely to induce other workers to assist in proving or disproving the parallelism between feeding and colour tests. In a preliminary paper figures were perhaps set out more clearly on the colorimetric values of these oils.

The next paper, read by Mr. F. Wokes, was :—

The Vitamin Content of Tinct. Limonis Fort., B.P.C.

By S. G. Willimott and F. Wokes

[Abstract appears on p. 248]

Discussion

The Chairman remarked that it was interesting to note the extraordinary variation of different vitamins in different parts of the same plant.

Captain Hill suggested that a parallel might be found in some work on oxidases that he had been engaged in. The oxidase system was not complete in the inside of the potato, but extended to the peel, in which there was an inhibitor present.

Mr. Wokes, in reply, said that the same idea had occurred to the authors, who are working on it. A peroxidase was found in the albedo and also in the flavedo.

The next paper taken was :—

The Electrolytic Determination of Arsenic in Chemicals

By N. Evers

[Abstract appears on p. 259]

Discussion

The Chairman remarked, in inviting discussion, that the paper would appeal to everyone who had done any practical work, and they would be grateful for this addition to their knowledge. The admirably clear lists of substances which do and do not require special treatment was particularly valuable.

Mr. A. J. Jones (London) asked what precautions could be taken in the case of the lead becoming insensitive, and whether the test could be applied direct to a solution of a substance instead of to a distillate of a wet ash from that substance. Hehner had found that apparent arsenic in beer could disappear. Would Mr. Evers recommend some method of estimating arsenic otherwise than by colour on a cap? He (the speaker) adopted the Marsh-Gutzeit method with a very small

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and constant flame. (Slides were passed up to the table by Mr. Jones at this point.)

Mr. T. E. WALLIS (London) inquired what strength of solution was used in making paper strips or caps—whether a saturated solution. (Mr. EVERS: No—about 1 per cent.)

Mr. C. H. HAMPSHIRE congratulated the author on a very practical paper. The electrolytic method did away with the difficulty in obtaining pure zinc. Could Mr. Evers give a more precise comparison of his method with that of the British Pharmacopœia?

Mr. WHITE (London) pointed out that possibly a cap was good as a limit test, but not when one wanted to get the proportion of arsenic. There was no difficulty now in getting zinc containing only 1 part of arsenic in 10,000,000. The Marsh-Berzelius method gives a good scale.

Mr. EVERS, replying to the points raised, agreed that a strip of paper was more accurate than a cap. Insensitive lead did not occur in the ordinary way. He had yet to find any foodstuff in which destroying the organic matter first made any difference. As to the degree of accuracy, there was no variation except that sometimes caused by zinc, a batch of which occasionally gave trouble.

The next paper taken was :—

Astringent Drugs and the Proposed B.P. Revision

By A. H. WARE

[Abstract appears on p. 249]

DISCUSSION

Mr. BRINDLE (Manchester) said he found that commercial block gambier is frequently adulterated with starch. The practice does not seem to be governed by the price, and he suggested that a sharp look-out be kept for the adulterant.

Mr. FINNEMORE (London) inquired if pharmacological experiments had been made on typical members of these series.

Mr. EVERS (London) said he could confirm Mr. Brindle's remarks. *E. kino* is difficult to get in this country, and is not from *E. rostrata*.

Mr. LINSTEAD (London) asked as to the strengths of the solutions used.

Mr. WARE, in reply, said he did not think cube gambier is generally adulterated, though the B.P. has a test for starch. The point regarding the pharmacological experiments requires clearing up, but he doubted the practicability. The solutions he had used had been adjusted by colour tests, but he had not used a tintometer.

The last paper, read by Mr. A. O. Bentley, was :—

An Automatic Continuous Percolator

By D. S. RATTRAY

[Abstract appears on p. 258]

DISCUSSION

The CHAIRMAN said that the apparatus, as shown in the sketch, appealed to him strongly as practical and ingenious.

Mr FINNEMORE inquired what volume of liquid extract of cascara, and of what strength, had been percolated by the apparatus in fifteen minutes. It seemed extraordinary.

Mr. BENTLEY, in reply, said that the liquid extract prepared was of B.P. strength and in the prescribed quantity.

THANKS TO AUTHORS OF PAPERS

The CHAIRMAN moved a hearty vote of thanks to the contributors who had sent the papers to the Section. The standard was fully up to that of former years. He also thanked the editor of "The Pharmaceutical Journal" for the books of reprints distributed. This composite vote of thanks was accorded by acclamation, terminating the proceedings just before four o'clock.

Delegates' Meeting

The PRESIDENT of the Pharmaceutical Society, Mr Bilson, occupied the chair at the delegates' meeting on Tuesday, and began by extending a hearty welcome to the delegates in attendance. He then read a *résumé* upon the four points dealt with by Mr. F. P. Sargeant at the delegates' meeting at Glasgow in 1925. The statement commenced by citing the four points put forward for discussion and the instructions to the Society's branches. The statement continued :—

Copies of Mr. Sargeant's paper and of the Northern Ireland Pharmacy Act were circulated to all branches early in this year, and branches were also asked to obtain at an early meeting the views of their members on the four points, and to transmit these views to headquarters. Twenty-seven branches have responded to this request, and, as might be expected, there is some divergence of opinion. Practically all the branches are in agreement with the first point,

Photo] [*Cleworth*

The Mayor of Leicester leaving the Conference

Left to right: MR. A. E. YOUNG, ALDERMAN G. BANTON, J.P. (Mayor of Leicester), MR. J. BARKER.

namely, a delegates' meeting to be given the powers possessed by the general meeting. On point No. 2 opinion was equally divided for and against; this is the suggestion to give the title "pharmaceutical chemist" to all persons on the Register. With the suggestion that all registered pharmacists should pay an annual registration fee, practically the whole of the branches are in agreement; and there is a majority in favour of the fourth suggestion that the Council of the Society should have power to remove persons from the Register.

The Council do not propose that there shall be any further discussion upon these points to-day, but the opinions expressed by the branches will be of considerable assistance to the Council in deciding upon the evidence which they are to give on behalf of the Society before the Departmental Committee which has just been set up to inquire into the whole question of the scope and administration of the Pharmacy Acts. I am quite certain that the discussions on these four points which have taken place at branch meetings during the last session have been extremely valuable, and will enable branches to follow more closely the proceedings of the Departmental Committee. That Committee has only recently been set up, and I feel that we cannot usefully discuss it at this early stage; but you may be quite certain that the Council are well aware of the great importance to us as a Society, and

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to pharmacy as a whole of this Departmental Committee, and that they will leave no stone unturned in their endeavour to ensure that the Society will emerge from the inquiry in a stronger and more satisfactory position than ever.

The PRESIDENT then introduced Mr. Neathercoat, and in alluding to the title of his address, mentioned that he had already contested one constituency. When the new Departmental Committee had been set up, added Mr. Bilson, the question of Parliamentary representation would come up.

Address on Parliamentary Representation

Mr. NEATHERCOAT discussed the question of pharmacy and Parliamentary representation. He declared that he was very glad indeed that the subject was one of those chosen by the delegates for consideration at the Conference, for it was urgent and important at the present time, and the Conference was a particularly apposite occasion for the subject to be well ventilated by pharmacists from all parts of Great Britain. Mr. Neathercoat proceeded :—

I propose to give an impartial review of the situation as I see it. I do not propose to make any personal reference to any particular candidate, past, present or future, or any type of party politics. As a matter of fact, I do not suppose there is anybody in the room knows what my particular party views are. (Cries of "Oh!" and laughter.) I propose to give my personal views only; these views will not be binding on any of my colleagues on the Council, nor are they binding on the Council itself. I propose to discuss this subject from the point of view of what is going to be best for pharmacy, and all other considerations I leave out.

With regard to Parliamentary representation generally, there was a time, of course, when to get direct, or to try and secure direct, representation for pharmacy was something not to be done. It is not done in the best society. But public views have altered tremendously in the past few years. The constitution of the House of Commons, and even of the House of Lords, has altered. Everybody is doing it to-day, either openly or semi-privately. Everybody who has got an interest to serve is trying to get representation. Doctors are doing it, the miners are doing it, and even the entertainment world has secured direct representation. And I am not at all sure that this is entirely in the sectional interest only; there is something of the public interest in it as well, because I feel it is in the public interest, when vital questions are being discussed in the House of Commons, that there should be somebody there who can guide the House in the special technical things that are being discussed. That is why I think it is not only in the interests of a section that this method should be adopted, but in the interests of the country itself.

Representation in the House of Commons does not mean speaking in debate or asking a large number of questions. It is the personal negotiation and the personal inquiries which an individual member can carry through with Ministers of the great State departments, and the opportunity that is provided of influencing all the other members of the House of Commons on the point of view which they know nothing about. Such members are very glad to get an opportunity of discussing with a man who knows. These are general conditions. There are, however, special and particular conditions which may be gained by pharmacy, as distinct from all other interests. Pharmacy, as we all know well, is a specialised thing, dealing with highly technical subjects. The pharmaceutical point of view and standpoint do not appear to be understood by the general public, and they are certainly not understood by members of Parliament, and very little understood by the departments of State and the Ministers at their head. Pharmacists have no strong voting interest. They are

Photo] [*Cleworth*

Group outside County Rooms, Leicester

Seated (left to right): MR. F. W. GAMBLE, MR. E. S. PECK, MR. F. P. SARGEANT, MR. D. LLOYD HOWARD (Chairman), MR. F. E. BILSON (President), MR. P. F. ROWSELL, MR. E. WHITE.

Standing (left to right): MR. R. R. BENNETT, MR. H. N. LINSTEAD, MR. C. H. HAMPSHIRE, MR. F. W. CROSSLEY HOLLAND, MR. W. G. MCNAB, MR. J. BARKER, MR. A. E. YOUNG, MR. H. B. MACKIE.

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ignored very often when political expediency happens to point in other directions. Pharmacy is not considered nationally as being of any great importance at all. Again, our interests frequently, very frequently, clash with the interests of other allied bodies. We clash with medical interests. We clash with other interests, and we invariably find that our interests clash with a body that has got pretty strong representation in the House of Commons, and a pretty strong backing in the country. That is why we suffer. Another point. The Pharmaceutical Society, throughout all its history, has never been much of a trade union. We have never adopted even the semblance of a trade union when dealing nationally with pharmaceutical affairs. But times are changing, and I am not at all sure that this is a policy that the leaders of pharmacy will have to keep rigidly to. For I am one of those who believe that a little more of the methods of the people that get things done might get things done for us. (Applause.)

The Present Situation

As for the particular urgency of the representation of pharmacy in Parliament at the present moment, I am just going to mention one or two things. One that occurs to me is that of proprietary medicine legislation. I heard it said the other day that that is dead. But don't you believe it. (Hear, hear.) It is quiescent, but it will bob up again; and when that day comes pharmacy will want representation in the House of Commons, as well as strong leadership in the country. Another one is the regulations under the Dangerous Drugs Act, another Act of Parliament. Hasn't it occurred to you that, during the last two or three years, when we have been bombarded with Regulations, irritated to exasperation almost, if we had an opportunity of getting our case put even privately to individual members of the House of Commons, and we had a man who could go down to the particular Government departments concerned—I am not going to mention them by name—we might have got a better hearing for the difficulties and troubles we have had in this direction?

Take, again, the British Pharmacopœia. It is bound to be a political question to a certain extent; and I am satisfied that in the future, when something is done with the British Pharmacopœia, it would be to the advantage of pharmacy if someone were in the House of Commons to tell them all about it. Take another case, the position of pharmacists in the Army, and the activities of the League of ex-Service Pharmacists. I am perfectly certain that Major Peck and Captain Hill would have one of the greatest difficulties they have had to compete with and overcome—and they are overcoming it gradually—removed; that is, to get into the minds of members of Parliament any interest in the scheme at all. They don't worry about it because they have never heard about it in the House of Commons. They don't know the rights and wrongs of it; they don't know the wrongs, at any rate, and they don't trouble. The cause the League is doing so much to serve at the present moment would benefit beyond all recognition by representation in Parliament.

The New Government Committee

There are also any number of other things. I was thinking of objects of all sorts of trade and business, of other things that irritate us and show lack of knowledge of the real facts. You, Mr. President, have mentioned the outstanding one, the new Government inquiry into the administration of the Pharmacy Acts and subsequent legislation that is bound to follow. I would like to say something about it. I did intend to say a good deal about it, but, being a member of the Committee representing the Society on that particular inquiry, I feel it would not be right and proper that I should offer any serious comment on it this afternoon. But I would say that I am not at all sure that the pharmaceutical community of the country realise the great importance of the inquiry and the great influence it is going to have on the future practice of pharm in the country. The whole of the Society's activit from every point of view, are in the melting pot o again, and the material and business interests of ev practising pharmacist in the country are vitally mi up with this Government inquiry. You want repres tation in Parliament when you consider that.

Continuing, Mr. Neathercoat said he knew quite that as far as he had gone he was preaching to converted. (Hear, hear.) The question now was: W were pharmacists going to do about it? For a consic able number of years the Pharmaceutical Society had a Parliamentary Fund. It was established at annual meeting in 1908, and, like a great number things in pharmacy and other walks of life, in a pa once again. But he felt that the policy adopted been thoroughly justified by events since then. work that was done subsequently by Sir William Gl Jones in Parliament was surely sufficient to convi anyone that when there was a great urgency bef Parliament in the House of Commons affecting ph macy it was vital that somebody should be there to something for the pharmacist. It was not the pol of the Parliamentary Committee to disclose what th was in the Parliamentary Fund, but he supposed th was nothing like enough for the purposes for which was required. He felt that the constitution and rules of the Parliamentary Fund were hardly suita for these days. They wanted more publicity in conn tion with the fund, and they wanted the fund to ha a broader basis.

Turning to practical suggestions, Mr. Neathercoat pressed the view that they should start afresh on new basis altogether, and urged that the delega present should ask the Society to take the matter hand and set up a new Committee. A meeting of t subscribers to the old fund should be called and a reso tion put that, in view of the fact that a new commit was going to be constituted, they should hand over t funds to the new body, seeing that both bodies w for the same purpose The Council should then inv certain people to serve on the Committee and call meeting quite quickly. In his opinion the Committ should be called the Parliamentary Representation Co mittee, and consist of seven members, comprising t President and treasurer of the Society, the chairman the Retail Pharmacists' Union Executive, the chairm of the Drug Club, the chairman of the Proprieta Articles Trade Association, and two others elected the delegates' conference. In that way all the interes in pharmacy would be represented as far as he cou see. The President of the Society should be chairm of the committee, the chairman of the Retail Pharm cists' Union Executive vice-chairman, and the treasu of the Society treasurer, while the secretary of t Society and the secretary of the Retail Pharmacis Union should act as joint secretaries. Bloomsbu Square would afford suitable headquarters. His vie was that the new committee should be an independe body with full powers, and not have to report to a other. They could make new rules and start at onc He thought the fund should be a secret one, collect publicly but administered privately, for absolute secre was necessary in a Parliamentary Fund. It must secret in regard to the amounts and persons to who grants were given, otherwise the main usefulness of fund of this character would be defeated. Unle secrecy was observed, the chances of any candida who was helped would be ruined. But the list subscribers, though not the amounts, should be pu lished. He thought the Committee should appeal once, as soon as it was set up, for a special donatio to meet the present-day need, and it should be unde stood that annual subscriptions should be sent to t fund just as was now done in the case of the Benevole Fund. He saw no reason why the subscription shou not be put down on the Society's application for for the membership subscription. The other organis tions might also adopt a similar practice.

British Pharmaceutical Conference, 1926.

Suggested Number of Candidates

The amount that would be required per head per ium from pharmacists practising in the country uld be considered small by the average trade ionist, for they were all contributing far ger sums from far less favoured circumstances many cases. The Committee ought to make an effort get a substantial sum of money together within the t six months, and he thought it should be possible get five or six candidates together for the next ction. They should make full inquiry in regard to didates, for he was quite satisfied it was not going be easy to get that number of candidates who had rmaceutical interests and could get elected. If they ld not get six, they would have to be satisfied with or four. He thought it would be best to specialise two candidates, but saw no reason why pharmacists uld have any qualms at all about what party a didate happened to belong to. Outside pharmacy it uld be idle for him (the speaker) not to disclose t he was a party man, but he did not care a jot ich party in politics a possible candidate might come m. All that he asked was that the man should ke a good advocate for pharmacy when he got into House of Commons. Let him be Conservative, eral, or a mixture of the two, a Socialist or a ourite, if he was prepared to help pharmacy in the use of Commons he should be supported as erously as possible by pharmaceutical funds. Phar- cy was the first and, to his mind, the only sideration. Some pharmacists felt that they could subscribe to a Conservative, and there were others could not subscribe to a Liberal, while still others lared, with great vehemence, that they could not scribe to any other parties in the State. But the n thing regarding the fund would be that phar- ists would be asked to subscribe for pharmacy, and to any party funds. And they should not wait to this in a panic a fortnight before a general election. would not be easy to act effectively at any time, it would be very difficult indeed if they waited il a few weeks before a general election. He hoped would not only decide to tackle the question ously and set up a committee at once, but also that n they dealt with the matter they would do it in horough and substantial manner. They had got to for substantial sums of money, for they had to k of big sums when dealing with Parliamentary k. A Parliamentary representation fund was really insurance charge on a scheme, which in very diffi- and dangerous times was going to help pharmacists preserve what they had got, and he invited the gates to give immediate consideration to what he eved to be a vital matter. (Applause.)

A discussion followed.

The paper of Mr. Herbert Skinner on the production of the British Pharmacopœia, and that of Mr. E. H. Timmons on apprenticeship, are unavoidably held over.

Who Were There

ns, F. W., Harrow
ns, Miss E., London
s, Mrs. E., Ross
liffe, H., Sheffield
burrow, J., and Mrs., Mel- Mowbray
haw, B., Oldham
s, T., Edinburgh
er, J., and Mrs., Leicester
ock, J. H., Leeds
lsley, W. J., Woodford
een
on, A. B., and Mrs., Port sgow
ett, R. R., and Mrs., Harrow
ett, R. P., Harrow
n, F. E., Bournemouth
kley, F. G., and Mrs., Leic.
er, C. G., and Mrs., London
r, Miss, Leicester
e, G. D., London
ey, A., Leicester
hwaite, J. O., London
hwaite, Miss, London
hewaite, T. V. C., Leicester
Bream, H. N., and Mrs., Leicester
Briggs, S. W., and Mrs., Sutton-in-Ashfield
Briggs, J. R., Sutton-in-Ashfield
Brindle, H., Manchester
Brinston, W., and Mrs., Liverpool
Brittain, E. H., and Mrs., Leicester
Browne, F., and Mrs., London
Browne, Wm., Mrs. and Miss, London
Bryant, E. G., Aberdeen
Bullions, J., Pelaw
Burgess, F. W., Brighton
Burkin, —, and Mrs., Sheffield
Burrows, E. L., Leicester
Butcher, R. J., Rotherham
Butler, E. H., and Mrs., Leicester
Caine, J. C., Mrs. and Miss, Birkenhead
Catto, A., Ilford
Cauming, Miss, Wallasey
Chapman, W., Shotts
Cholerton, A. F., Leicester
Clark, F. H., and Mrs., Leicester
Clear, H. W., and Mrs., Leicester
Cleworth, J., Mrs. and Miss, Manchester
Cooper, J. W., Bradford
Culbert, W. S., Airdrie
Dall, J., and Mrs., Edinburgh
Davis, H., Swansea
Deane, H., and Mrs., Sudbury
Deck, A., and Mrs., Cambridge
Dennis, H. H., and Mrs., Leicester
Dickson, R. J., and Mrs., Leicester
Dixon, W. L., London
Dobie, Miss E., Birkenhead
Duff, P. M., Glasgow
Dyer, F. J., Cardiff
Ellerington, J. P., London
Evans, G., and Mrs., Cambridge
Evers, Norman, London
Falding, W. B., London
Farquhar, J., and Mrs., Aberdeen
Ferriday, A. J., and Mrs., Liverpool
Ferrier, James, Falkirk
Findlay, Miss, Huggescote
Finnemore, H., Croydon
Forbes, J. J., and Mrs., Perth
Forbes, W. B., Cardiff
Forster, W., Seaham Harbour
Franklin, J. H., Manchester
Freke, Mrs. A., and Miss, London
Fry, A. E. E., and Mrs., Leicester
Gamble, F. W., and Mrs., Harrow
Gaze, W. E., London
Gilmour, A. B., Glasgow
Gilmour, J. P., London
Green, H. H., Leicester
Guthrie, Thomas, Glasgow
Hallett, W. J., and Mrs., Bath
Hampshire, C. H., London
Hancock, S. R., and Mrs., Leicester
Harley, David, and Mrs., Musselburgh
Harris, J. Flinton, Northampton
Hay, J. W. T., Bolton
Hayes, Miss G. Dennis, London
Hayworth, E. B., and Mrs., Gt. Harwood
Hearnshaw, W. D., and Mrs., Leicester
Hemming, T., Southsea
Hewitt, C., and Mrs., Sheffield
Hill, Capt. H. A., and Mrs., London
Hill, J. Rutherford, Edinburgh
Hills, F. W., London
Hindes, Miss Gwen, York
Hines, F. G., and Mrs., York
Hirst, J. L., and Mrs., Liverpool
Hodgson, H., York
House, C. J., Birmingham
Howard, D. Lloyd, Ilford
Hughes, Martin S., and Mrs., Liverpool
Jack, J., and Mrs., Arbroath
Jackson, J. Gilbert, and Mrs., Sheffield
James, P., Cheltenham
Jenkin, A. H., London
Johnson, W. I., Leicester
Jones, A. J., and Mrs., London
Jones, H. Humphrey, and Mrs., Liverpool
Jones, J. C., Leicester
Jordan, C. J., Exeter
Knott, E., and Mrs., Edinburgh
Knott, P., and Mrs., Bolton
Laidlaw, A. G., and Mrs., Lockerbie
Lander, Norman, Huddersfield
Lawman, F. A., and Mrs., London
Lean, Wilfred, Burton-on-Trent
Lescher, T. E., Liverpool
Lewis, Thomas, Cardiff
Lightbown, W. H., Blackburn
Linstead, H. N., London
Lloyd, I. T., and Mrs., London
Lovell, H. M., and Miss, Leicester
McBryde, Jas., Colchester
McCall, Dr. D., Dundee
Mackie, H. B., and Mrs., Brighton
Mallinson, G. A., London
Marfitt, G. E., Leicester
Martin, H. A., and Mrs., Leicester
Meldrum, Martin, Ayr
Melhuish, A. R., London
Merrin, A. C., London
Mitchell, D., Inverness
Morris, J. R., Colchester
Morton, Dr. B., Rotherham
Neathercoat, E. T., Weybridge
Neve, H. C., and Mrs., London
Nixon, W., Sunderland
O'Flanagan, Miss E. M., Monktown
Partington, C., Leicester
Peberdy, T. C., and Mrs., Leicester
Peck, E. S., and Mrs., Cambridge
Pegg, J. A., and Mrs., Mansfield
Perkins, Miss M. H., Leicester
Plowright, J., and Mrs., Brighton
Prior, J. S., Stamford
Purse, F., Leicester
Rees, D. A., and Mrs., London
Restall, Miss W. D., Hugglescote
Richardson, Misses A. F. and M., Leicester
Richardson, H. S., and Mrs., Hull
Rimmington, G. H., and Mrs., Leicester
Roberts, Miss G., Llandudno
Roberts, Mrs., Salford
Rowsell, P. F., Mrs. and Miss P., Exmouth
Sargeant, F. Pilkington, and Mrs., Leeds
Scholes, Wm. J., Eccles
Short, G. R. A., Reading
Simmons, E. H., and Mrs., Salford
Sinclair, G., Peebles
Skinner, H., London
Smith, F., and Mrs., Birmingham
Smith, G., Dundee
Smith, G. W., Enderby
Smith, R., Stornoway
Snow, W. G., Birkenhead
Spiers, A. H. and Mrs., Leicester
Sproule, Miss R., London
Squires, S. S., and Mrs., Leicester
Stiles, P., and Mrs., Market Harborough
Sturges, H. M., and Mrs., Leicester
Symonds, J. A., and Mrs., Ipswich
Thompson, F. W., and Mrs., Leicester
Tocher, G. A., London
Todd, J. P., and Mrs., Glasgow
Tomlin, E., Mrs. and Miss, Leicester
Trick, W. B., New Barnet
Tristram, W. J., and Miss, Liverpool
Tyler, A. P., London
Tyler, G. V., Leicester
Wallis, T. E., London
Walters, J. T., and Mrs., London
Wand, A. E., and Mrs., Leicester
Ward, E. B., and Mrs., Leicester
Wardropper, H., Sunderland
Ware, A. H., Devonport
Westhead, W., and Mrs., Leicester
White, E., and Mrs., London
Williams, D. J., Bath
Williamson, F. A., Preston
Winch, H. C. M., Sunderland
Wokes, F., Liverpool
Wood, J., and Mrs., Wallasey
Wrench, A. G., and Mrs., Croydon
Wyall, W., and Mrs., Eccles
Young, A. E., and Mrs., Leicester
Young, F. J., and Mrs., Leicester
Young, W. T., and Mrs., Leicester

The luncheons which were held each day at the Oriental Hall were admirably arranged, and the small tables, decorated with flowers, afforded an excellent opportunity for an exchange of opinions over the earlier proceedings. There was, too, that friendly atmosphere which made the newcomer to Conferences feel like an *habitué*, a matter which was undoubtedly facilitated by badges bearing the name and address of the wearer.

British Pharmaceutical Conference, 1926.

THE SOCIAL SIDE

The fact of the opening of the Abbey Park Flower Show occurring on the same day as the opening of the Conference gave rise to a ladies' excursion of an unusual and very pleasurable kind. Invited to attend the formal opening ceremony, which took place between the Chairman's Conference address and the luncheon hour, the ladies saw with keen interest the many striking features of a remarkable display.

* * *

They were loud in their praises of the graceful speech in which the Mayoress declared the show open, and next, perhaps, in their admiration of the cottagers' section. It appears that Leicester working men are among the keenest allotment-holders in the country, a fact productive of corresponding results in their annual display.

* * *

The Conference banquet, held in the spacious De Montfort Hall, owed much to the thoughtful arrangement by which the members and their friends were distributed around circular tables. The floor of the hall, which is of dimensions comparable with those of the larger concert halls of London, looked very gay with its groups of six or eight diners.

* * *

Supporting the chairman (Mr. D. Lloyd Howard) at the top table were the Mayor and Mayoress of Leicester (Alderman and Mrs. Banton), Colonel C. J. Bond, C.M.G., F.R.C.S., the President of the Pharmaceutical Society (Mr. F. E. Bilson), several members of the Society's Council (accompanied, in most cases, by their wives and other friends), Dr. R. F. Rattray (President of University College, Leicester), Mr. W. G. McNab, Mr. C. H. Hampshire, Mr. F. W. Crossley Holland, Mr. F. W. Gamble, Mr. J. Rutherford Hill, Mr. A. E. Young, Mr. Burgess, Mr. Duff, and Mr. O. Riordan.

* * *

Colonel Bond proposed the conjoint toast of "The Society and the Conference" in an eloquent speech. Colonel Bond showed himself well aware of the implications of the Therapeutic Substances Act, as might have been anticipated in the case of a distinguished member of the Medical Research Council. He congratulated the Pharmaceutical Society on the opening of the new pharmacological laboratories, and in lighter vein suggested that we might speak of a preventive pharmacy as well as of a preventive medicine. "It seems, sometimes," he commented, "as if we had gone mad about drugs. Both professions, the medical and the pharmaceutical, must educate the public in returning to a simpler way of life."

* * *

Brief replies were made by the President of the Pharmaceutical Society (Mr. Bilson) and the Chairman of the Conference (Mr. Lloyd Howard), the latter making the just observation that the Conference gets many contributions from young men, some of whom are in laboratories, some practising pharmacists, some teachers, and some students. After this a topical song by Mr. John Goddard was introduced into the programme, causing great hilarity by its mention of most of the Conference "stars." The musical programme, by the way, was drafted on generous lines, suggesting Victorian opulence rather than Georgian conciseness; and not all of the members and visitors stayed the course.

* * *

The toast of "The City and Corporation of Leicester" was given with his customary verve and polish by Mr. E. T. Neathercoat. All the members of the Conference, he said, were feeling very warm regard for this wonderful city of Leicester and for its Mayor and its hospitable people. The health interests of t city, continued Mr. Neathercoat, were quite safe unc the hands of its pharmacists—they would do them we (Laughter.) The city had some wonderful industri and was rich in educational endowments. It had h six Pereira medallists—with a monotony almost tirir The city kept pace with the changes in fashion of t ladies. (Laughter.) The Mayor, who had done justi to pharmacy earlier in the day, briefly responded.

* * *

Mr. R. R. Bennett, in proposing "Our Guests" paid a tribute to the Mayor's interest in educatic and to the efforts which had been made to enterta the Conference visitors. Among the guests he ma special reference to Colonel Bond and to Dr. R. Rattray, President of University College, who, understood, had studied at five universities in fo countries. The last-named, in reply, said that was entirely in agreement with the Society in the decision only to recognise fully equipped departmen in regard to the degree. In conclusion, he paid glowing tribute to the local chemists and to the generosity towards the College.

* * *

The work of the Local Executive Committee, t mainspring of the enjoyment of the visitors, meri more than this passing tribute. That everything we according to programme speaks volumes with regard the efficiency with which the preliminary spade wor had been done. So far as we noticed, the inquir office of the Conference was not overburdened wit callers—another fact significant of much.

* * *

Glorious weather favoured the ramble on Wednesda The first visit was paid to St. Martin's Church, whic is at present undergoing alterations in view of it becoming the cathedral. Close by is the old Town Hal with its many historic associations, dating from abou 1400. The room over the Mayor's Parlour, known a the Grand Jury Room, is now used by the Leicester shire Archæological Society; otherwise the building i of museum interest. Continuing on their way th ladies visited St. Nicholas' Church and the Law Courts while the remainder of the morning was spent inspect ing the shops and the large open-air market.

* * *

Wednesday's garden party, in the handsome ground of the Leicester, Leicestershire and Rutland Univer sity College, proved enjoyable even beyond the standar of such functions of the Conference. After being received by Dr. and Mrs. Rattray, the visitors found shade under ancient trees, while an excellent orchestra played selections of light music. The taking of th Conference photograph provided some impromptu fun and then the group was welcomed by Dr. Astley V. Clarke, J.P., on behalf of the governors of the College Dr. Rattray, who followed, indicated that the College was open to the company to roam through as they pleased: of this signal courtesy the majority, after tea had been served, took full advantage. (The build ing and grounds were presented to the city by the late Mr. Thomas Fielding Johnson in 1919.) An exhibition of swimming was given in an open-air bath close by; and at the close of the afternoon a wreath was laid on the cenotaph in Victoria Park by the chairman of the Conference.

* * *

On Wednesday evening a dance was held in the De Montfort Hall, commencing at 8 o'clock and continuing until after midnight. The function was well attended, and card tables were available for those who did not wish to dance. In the course of the evening a ballet performance was presented and was highly appreciated.

Trade Report

42 Cannon Street, E.C.4, August 5.

BUSINESS has been partially suspended this week owing to the Bank Holiday, and conditions are likely to remain uninteresting throughout the month, pending a settlement of the coal trouble. The recovery in French currency is regarded as a hopeful factor. Interest in crude drugs has again centred in senega and cascara sagrada, both of which have improved, particularly the latter. Dutch caraway seed has further advanced on an official revision of the crop estimate, this practically being the only change in the seed market. The demand for essential oils has been slow, and price changes are generally unimportant apart from exchange fluctuations. Higher prices are wanted for Bourbon geranium. Dutch caraway and American spearmint are dearer. Cheaper rates are quoted for cassia, cedarwood, lemon, Sicilian orange, and Paraguayan petitgrain. Mandarin is lower, and there are indications of a decline in new crop American peppermint. In pharmaceutical chemicals the volume of business has fallen off owing to the holidays, but the general tone continues quite steady. Vanillin is being freely cut as a result of Continental competition. Resorcin is somewhat cheaper. Among industrial chemicals conditions remain much as previously reported, the holiday season and the lack of fuel being the predominant factors. Alum, Epsom salt, Glauber's salt, lead acetate, and potassium carbonate are among the easier products. Supplies of coal tar products continue very restricted, and prices are mostly nominal. Carbolic acid crystals are rather firmer, and toluol is dearer. The so-called fixed oils have been very dull with the exception of linseed, which has been quite active and firm; turpentine is irregular; soya and palm oils are easier, while castor is steady.

Higher	Firmer	Easier	Lower
Antimony	Caraway oil	Alum	Citronella oil (Jv.)
Caraway seed	Carbolic acid crystals	Cassia oil	Lemongrass oil
Cascara sagrada	Linseed oil	Cedarwood oil	Mandarin oil
Geranium oil	Spearmint oil	Epsom salt (coml.)	Peppermint oil (Amer.)
Pitch		Glauber's salt	Petitgrain oil
Senega		Lead acetate	Rubber
Toluol		Lemon oil	Shellac (T.N.)
		Orange oil	Sodium sulphide
		Palm oil	Vanillin
		Potash carbonate	
		Resorcin	
		Soya oil	

Cablegram

NEW YORK, August 4.—Business is fair. Mandrake root is dearer at 12c., and senega has advanced to 65c. per lb. Short buchu is higher at 47c. per lb. Peppermint oil of old crop in tins is cheaper at $13.25 per lb., and hydrastis (golden seal) has declined to $4.80 per lb. Balsam Peru is lower at $1.70 per lb.

Crude Drugs, etc.

ANTIMONY.—Chinese regulus was much stronger again on a more active demand, business for near shipment having been reported up to about £49 c.i.f., and fair-sized lots on the spot changed hands at £61 to £62, with buyers over at the higher figure. The difficulty in securing shipment from China has been the main stimulating factor. Crude spot is £46 and £41 per ton c.i.f. for shipment.

CARAWAY SEED is again higher, new crop Dutch offering for October-December shipment at 34s. c.i.f., and prompt shipment at 32s. 6d. c.i.f. Last week it was officially reported that the Dutch crop would be about two-thirds of the normal, but the estimate has now been reduced to only half of a normal crop.

CASCARA SAGRADA has further advanced, shippers quoting 61s. to 62s. per cwt. c.i.f. for 1926 bark to arrive. Business was done last week at 58s. c.i.f. On the spot, 1924 bark is 67s. 6d. to 70s., and 1925 62s. 6d. per cwt. As stated previously, a smaller crop is anticipated this year, and there appears to have been renewed buying on the other side.

CHAMOMILES.—Fair white Belgian of 1925 crop can be had at 110s. per cwt. on the spot, which is regarded as a reasonable figure in view of the new crop prospects.

CIVET.—A parcel afloat of Abyssinian, direct shipment, is offered at 8s. 6d. per oz. c.i.f.

CLOVES are dull, with Zanzibar offering at 9¼d. to 9¾d. per lb. on the spot as to quality, and August-October shipment at 8½d. c.i.f. The landings in London during the week ended July 31 were *nil*, and the deliveries 523, leaving a stock of 12,503 bales, against 11,473 bales in 1925 and 25,026 bales in 1924. Up to July 31 the landings of Zanzibar in London have been 9,759, against 9,357 in 1925, while the deliveries amount to 11,456, against 12,888 last year.

COD-LIVER OIL.—Our Bergen correspondent writes on August 2 that the market continues unaltered and steady at 105s. per barrel c.i.f. London for finest non-freezing steam-refined quality.

GINGER.—Chinese dried cargo ginger in cases is quoted at 78s. per cwt. c.i.f.

HYDRASTIS.—The spot price is firm at 27s. per lb., and to arrive 21s. 6d. per lb. c.i.f. is quoted.

IPECACUANHA.—An arrival of 51 packages Matto Grosso has taken place from Uruguay.

MAGNESIUM.—Business has been quiet, but home makers maintain their prices as before, small ingots and sticks being 3s. 9d. to 4s. 3d. per lb., while powder is selling at about 3s. to 6s. per lb., according to quality.

MENTHOL is quiet, with Kobayashi-Suzuki offering at 19s. per lb. on the spot. September-October shipment is offered at 17s. 3d. c.i.f., and October-December at 16s. 6d. c.i.f.

MERCURY.—The tendency became rather firmer again, chiefly in consequence of the limited quantities on offer. Quotations are £15 7s. 6d. to £15 10s. per bottle, and it is rather difficult to secure small lots at below the higher figure.

RUBBER.—The market has fallen considerably since our last, the decline at one time being fully 2d. per lb. The great struggle between the producers and American buyers ended on Friday in favour of the latter, with the result that the average price for the past quarter was 1s. 9.0001d. per lb., which means that for the new quarter, viz., August-October, the standard production will continue at 100 per cent. The effect of this, combined with the disappointment of holders who expected a "cut," revealed a staleness amongst these operators, and large quantities were thrown on the market with orders to sell at best. Spot, which at one time went down to 1s. 6¼d., was much steadier at the close, 1s. 6⅜d. having been paid. Deliveries last week were fairly heavy, and resulted in a decrease of 94 tons in the stocks. London stock now stands at 27,766 tons. Quotations (Wednesday, 5 p.m.); No. 1 standard ribbed smoked sheet, spot and August, 1s. 6⅜d.; September, 1s. 7d.; October-December, 1s. 7¼d. per lb.

SEEDS.—Owing to the holidays and the total absence of demand, there are no changes to report in the seed market, and prices are as under:—CANARY SEED.—Mazagan has sellers at 22s. 6d. per cwt. on the spot, and 20s. 6d. for forward shipment. New crop Saffi is offered at 21s. spot, Larache 22s., good bold Spanish 34s., and small 25s. per cwt., ex wharf. CUMIN SEED.—Maltese is 32s. 6d. for old crop, and for new crop for forward shipment 35s. c.i.f. would probably be accepted. Morocco is 32s. 6d. to 35s. spot and 33s. c.i.f. for new. ANISE.—Spanish, 50s.; Russian, 42s. 6d.; Levant, 40s. per cwt. spot. CORIANDER SEED.—Morocco, 14s. 6d. on the spot, and 12s. 9d. is quoted c.i.f. for new crop. DILL SEED.—20s. per cwt. FENUGREEK SEED.—Morocco is 11s. 6d. to 12s. per cwt. spot, and 10s. 6d. c.i.f. for new crop for forward shipment. HEMPSEED.—Manchurian, 16s. per cwt. LINSEED.—Mazagan, 20s. on the spot, and 18s. 6d. c.i.f. for new crop. MUSTARD SEED.—English is 57s. 6d. to 59s. 6d. per cwt. on the spot.

SENEGA shows a further advance, with spot sales up to 3s. per lb., and for new crop up to 2s. 11½d. c.i.f. has been paid. Reports from Canada and the United States continue very strong.

SHELLAC.—The trade demand has been fairly active, but the tone is rather easier. There was a slight decrease in the London warehouse stocks during the past month to 12,944 cases. The landings amounted to 4,762 cases, against which the deliveries totalled 4,786 cases. Usual standard TN orange on spot is 125s. to 130s. per cwt.; fine orange is 145s. to 200s.; superfine, 220s. to 260s.; and AC cakey, 130s. To arrive, TN for July-August shipment is 109s., and October 111s. c.i.f. Previous to the holiday August delivery sold at 122s., and since at 120s. 6d.; October at 124s., and December at 121s. Calcutta is Rs.48.8 spot.

SOY.—Chinese Seuloong brand is offered for shipment at 2s. 2d. per gall. c.i.f.

Essential Oils

THE prospects of the new crops of French lavender and American peppermint are attracting interest, but the demand for essential oils generally is slow. Bourbon geranium is dearer; Dutch caraway and American spearmint have advanced. Easier rates are quoted for cassia, American cedarwood, lemon, Cochin lemongrass, Sicilian sweet orange and Paraguayan petitgrain oils. Java citronella is cheaper. Mandarin has declined and American peppermint is cheaper.

ANISE (STAR).—"Red Ship" has been in demand on the spot at from 2s. 10d. to 2s. 10½d. per lb., and is firm at the higher quotation. Drums are quoted at 2s. 5½d. net. For shipment, 2s. 5d. c.i.f. is quoted for loads.

BERGAMOT is steady at 23s. 6d. to 24s. 6d. per lb. for 37 to 38 l.a. on the spot or c.i.f. In one direction a higher price is quoted.

CARAWAY is dearer, Dutch double rectified being quoted at 6s. 6d. per lb.

CASSIA is cheaper on the spot with sellers at 7s. 10½d. per lb. For shipment, 6s. 5d c.i.f. is quoted.

CEDARWOOD.—American is cheaper in drums at 1s. per lb., and cases at from 1s. 2d. to 1s. 3d.

CINNAMON.—Ceylon leaf is dull at 5s. 4d. per lb. in drums and 5s. 7½d. for cases. In response to recent bids, it is reported that there are no stocks available at the source.

CITRONELLA.—Ceylon on the spot is steady at 1s. 7d. per lb. and 1s. 6d. c.i.f. for shipment. Java oil is cheaper at 2s. 4½d. per lb. on the spot and 2s. 3½d. c.i.f. to arrive.

CLOVE.—English distilled is unchanged at from 6s. to 6s. 3d. per lb.

GERANIUM.—Bourbon oil is still fluctuating, with a tendency towards lower prices, although the improved value of the franc neutralises the decline. Forward quotations were current recently up to 285 fr. per kilo, c.i.f., but offers have since been made at 250 fr. Spot value is nominal and several holders have withdrawn. This week Algerian was quoted at 215 fr. c.i.f.; on the spot the value is nominal at 11s. 6d. This is 3s. above the value at which sales were made recently.

LAVENDER.—Interest is centred in the new crop French oil, which is now in course of production. As is usual at the outset of the crop, there are reports of high prices; this follows on orders from America, which have helped to reduce the considerable carry over from last year. The price reported from Grasse is about 300 fr. per kilo, but the value is still to be fixed. The present spot quotation in London is about 14s. 6d. to 15s. 6d. per lb. for 38 to 40 per cent. Recently sales have been made at 12s. to 13s.

LEMON.—Spot sales have been made at around 7s. 3d. per lb., and up to 7s. 6d. is quoted. For shipment 7s. 3d. to 7s. 5d. c.i.f. is wanted.

LEMONGRASS.—A small demand is noted for Cochin, which is easier at 3s. 5½d. per lb. c.i.f. On the spot 3s. 6½d. is quoted.

LIME.—So far no reliable information has come to hand regarding the extent of the damage done to the lime trees by the recent hurricane in the West Indies, and spot sellers of distilled meantime have withdrawn. There are still offers of hand-pressed at 35s. per lb.

MANDARIN.—Lack of demand has brought about a sharp decline, certain brands being obtainable on the spot down to 21s. per lb., and for shipment 20s. to 24s. c.i.f.

ORANGE.—Sicilian sweet has further declined owing to lack of demand, from 7s. 9d. to 8s. 6d. per lb. c.i.f. being quoted as to brand. On the spot there are sellers at from 8s. to 8s. 6d. *Bitter* is quoted at 8s. 3d. c.i.f.

PENNYROYAL.—Spanish is steady on the spot at 6s. 9d. per lb.

PEPPERMINT.—This week there is an underlying weaker tendency in the position of new-crop American natural in oil, and a lack of news, which is unusual so near the new crop. Buyers on this side are holding aloof in the absence of "pointers" from the leading importers, and a fair amount of business is likely to result following definite news of the crop. Leading brands are quoted for August-September shipment at the nominal price of 49s. 6d. per lb. c.i.f. But several shillings less would undoubtedly be accepted with an order in hand. Old crop is nominal at 58s., ex warehouse. Japanese dementholised is steady at about 10s. 6d. per lb. on the spot for Kobayashi-Suzuki, and bids have been made for quantities at slightly below this figure. To arrive, August-September shipment is 10s. 6d., and October-December 9s. 3d. c.i.f.

PETITGRAIN on the spot is cheaper at 7s. 6d. per lb., or a shade less, for Paraguayan.

SPEARMINT has been inquired for during the week without much business resulting, and prices are still inclined to harden at from 33s. 6d. to 36s. per lb. for cases of American.

The following arrivals have taken place from the countries indicated during the period July 29 to August 4 (inclusive):—Bergamot (It.), 7 cs.; cananga (Jv.), 1 dm.; cassia (Ch.), 10 cs.; citronella (Jv.) 7 dm., (Cey.) 4 dm.; geranium (Fr.) 7 cs., (Réun.) 5 dm.; gingergrass (Br. Ind.), 2 cs.; guaiacumwood (Ger.), 5 cs.; juniperberry (Ger.), 1 cs.; lavender (Fr.), 3 cs.; lemon (It.) 38 cs., (Ger.) 2 cs.; orange (It.), 5 cs.; peppermint (Jp.), 60 cs.; rose (Holl.), 1 cs.; rosemary (Sp.), 2 dm.; spike (Sp.), 1 cs. Various (Fr.) 11 cs., (Ger.) 1 cs., (Holl.) 6 cs., (Jp.) 8 cs., (U.S.) 34 cs.

Pharmaceutical Chemicals, etc.

THE volume of business transacted has perhaps been rather less than preceding weeks, and this falling off may be attributed to the holiday season. The general tone continues quite steady. The only interesting item is the position of vanillin.

ACETANILIDE continues fairly steady but in very little request: B.P. crystals and powder quoted at 1s. 6d. to 1s. 6½d. per lb.

AMIDOPYRIN is quoted at about 12s. spot for small parcels; business is still slow.

ASPIRIN.—Occasional business has been done in limited quantities and at keen prices: quoted from 2s. 4d. to 2s. 4½d. per lb.

BENZOIC ACID (B.P.) has met with fair business, with prices unchanged: British B.P., 2s. 1½d. to 2s. 3d. per lb., ex works, according to quantity; Continental, practically free from chlorine, 3s. 3d. per lb., spot.

BROMIDES are quiet but steady: ammonium, 2s. 3d. per lb., in cases; potassium, B.P. crystals and granular, 1s. 8¼d. to 1s. 8¾d. per lb.; sodium, B.P., 1s. 10½d. to 1s. 11d. per lb.

CALCIUM LACTATE is offered at 1s. 3d. for small parcels.

CITRIC ACID.—Business has been only moderate, and prices are about the same at 1s. 3¼d. to 1s. 3½d. per lb., according to quantity.

GUAIACOL CARBONATE meets with only a very limited business at about 7s. 2d. to 7s. 3d. per lb.

HEXAMINE shows no change, with free running crystals at about 2s. 5d. per lb., and less for ordinary material. Fine powder is a penny per lb. more.

HYDROQUINONE is steady, with some business passing at from 4s. 3d. to 4s. 6d. per lb.

ISOPROPYL ALCOHOL.—British made is quoted at 16s. per gallon.

LACTIC ACID (B.P.) is offered in quantities to arrive in demijohns at a shade under 2s. 3d. per lb.; smaller lots, 2s. 4d. per lb.; technical, 50 per cent. by weight, £41 per ton, net.

MENTHOL (SYNTHETIC).—English makers quote 14s. per lb.

METHYL SALICYLATE is steady but rather dull at about 1s. 4½d. per lb., for quantities in carboys.

PARAFORMALDEHYDE (100 per cent. powder) is steady at about 1s. 9d. per lb.

PARALDEHYDE is steady but still dull at 1s. 2d. to 1s. 4d. per lb.

PHENACETIN is steady but quiet at 3s. 10d. to 3s. 11d. per lb.

PHENAZONE is offered in small lots at about 6s. per lb., and a shade less for quantities.

PHENOLPHTHALEIN is unchanged at 4s. to 4s. 1d. per lb.

POTASSIUM PERMANGANATE (B.P.) is dull at 6⅝d. to 7d. per lb. in drums.

RESORCIN is easier at about 4s. 9d. to 5s. per lb. for quantities.

SALICYLIC ACID (B.P.) is unchanged; business remains rather subdued, while prices are steady: five-cwt. lots at about 1s. 3d. per lb.; small parcels, 1s. 3½d. to 1s. 4d. per lb.; technical, 10¾d. per lb., ex works.

SALOL is steady at about 3s. 3d. per lb.

SODIUM BENZOATE (B.P.).—Spot parcels continue to be quoted at about 1s. 8d. per lb., while to arrive is offered at much lower rates.

SODIUM DIETHYLBARBITURATE is dull at about 10s. per lb.

SODIUM SALICYLATE (B.P.).—Competition continues keen for any good business: B.P. crystals, 1s. 9d. per lb.: B.P. powder, about 1s. 9d. per lb.

SULPHONAL remains very quiet at about 10s. 9d. per lb.

TANNIC ACID.—B.P. *levissimum* is offering at about 2s. 8½d. to 2s. 9d. per lb., in kegs; small parcels, 2s. 10d. per lb.

TARTAR EMETIC remains dull, dealers offering 43 to 44 per cent. technical, 11½d. per lb., to arrive; B.P., 1s. 10d. to 1s. 11d. per lb.

TARTARIC ACID is about the same, with business restricted: spot and forward, about 11¾d. per lb., less 5 per cent. for B.P. crystals of foreign make.

TERPIN HYDRATE.—There is very little interest in offers, which are down to about 1s. 6d. per lb.

THYMOL is steady but quiet at about 12s. per lb. for B.P. fine white.

VANILLIN appears to have been largely upset by the recent introduction of occasional parcels of cheap Continental make, which were offered here at about 19s. per lb. Although the British makers are not openly quoting at this figure it is believed they are accepting business at about that level.

Among the imports of chemicals which have paid Key Industry Duty are the following:—Acetylsalicylic acid, £183; amidopyrazolone, £233; atophan, £1,218; benzonaphthol, £227; bromide salts (ammon. potash, soda), £934; butanol, £1,377; carbon tetrachloride, £131; —hydrochloride, £107; milk of magnesia, £654; paraformaldehyde, £156; phonazone, £115; undescribed chemicals, £1,743.

Industrial Chemicals, etc.

London, August 4.

WITH the commencement of the holiday season and the continuance of the coal strike, business has naturally been very slack. The general tone, however, continues fairly steady, and only one or two minor changes are recorded.

ACETIC ACID is fairly steady, but in only poor demand: 80 per cent. technical, £37; 80 per cent. pure, £39 per ton, in barrels; glacial, pharmaceutical, 99 to 100 per cent., £65 10s. in glass demijohns; glacial, in barrels, £55 per ton.

ACETONE.—The distributors have not yet notified any definite prices under the new conditions of a competitive market. B.G.S. in drums is nominally at £75 per ton, but any sales would be at much lower rates.

ALUM is slightly easier, with spot parcels of lump in casks offering from £8 10s. to £8 15s. per ton. Slightly cheaper rates for quantities to arrive.

AMMONIA (ANHYDROUS) is very steady, and spot business in small lots continues quite good. Dealers quote at 1s. 1½d. per lb., in loaned cylinders, carriage paid.

ARSENIC.—The demand is slow, but the tone is fairly steady on the basis of about £13 to £13 10s. f.o.r. mines for white Cornish, although Grecian is quoted at about £13 10s. c.i.f. for near shipment.

BARIUM CHLORIDE.—The position is still unsettled, and it would be difficult to obtain to-day's quotation of £9 15s. per ton for any quantity of 98 to 100 per cent. prime white crystals. Rather easier terms may be expected.

COPPER SULPHATE.—The export demand is quiet, while currency difficulties render new business more complex; makers are quoting about £23 5s. to £23 15s. per ton, f.o.b.

CREAM OF TARTAR is quiet, with prices mentioned by dealers showing no change at 76s. to 77s. per cwt.

EPSOM SALT remains very quiet, and some spot parcels are now offered down to £5 to £5 2s. 6d. per ton, in single bags, ex store.

FORMALDEHYDE is still dull at £40 per ton for 40 per cent.

FORMIC ACID is steady but not in much demand at present: 85 per cent., £52 10s.; 90 per cent., £54 10s. per ton, in carboys, ex wharf.

GLAUBER'S SALT remains very dull, and the market for spot parcels is a shade easier at £3 10s. to £3 12s. 6d. per ton, for commercial quality, in single bags, ex store.

LEAD PRODUCTS.—Lead acetate is easier and very quiet: spot parcels, brown, £40 12s. 6d.; white, £43 per ton, ex store. Red lead, imported, £39, c.i.f. London. White lead, dry, £39; ground in oil, £40 10s., c.i.f. London.

LITHOPONE is very steady, and business has been as good as can be expected; dealers offer best brands of 30 per cent. Continental red seal at £20 to £20 10s. per ton, in casks, ex store. Slightly cheaper prices for contracts.

OXALIC ACID remains very dull, with spot quoted at about 3½d. per lb.

POTASH CAUSTIC.—Dealers' prices under control are very steady, with spot 88 to 92 per cent. solid at £27 10s. per ton, in drums.

POTASSIUM CARBONATE is a shade easier, and business is still slow: 90 to 92 per cent., £27 10s.; 96 to 98 per cent., £26 per ton, in casks, ex store.

POTASSIUM CHLORATE is unchanged, but the market is not firm: powder, 3¾d.; crystals, 4d. per lb., in kegs.

POTASSIUM PERMANGANATE is steady but in rather poor demand: commercial quality, in 2-cwt. drums, 5¼d. to 5½d.

POTASSIUM PRUSSIATE is still quoted at about 7d. per lb., in casks, but at this figure the market is easy.

SODIUM ACETATE continues very firm, with supplies scarce; spot and forward quoted from £20 17s. 6d. to £21 5s. per ton.

SODIUM HYPOSULPHITE.—Dealers' prices are unchanged; business fair, market steady. Pea crystals, £15 7s. 6d. per ton, in one-cwt. kegs; commercial lump, £9 per ton, in casks. British makers quote pure crystals for home consumers at £15 10s. per ton, delivered to buyer's station.

SODIUM SULPHIDE.—Dealers' prices are easier; market still dull: 60 to 62 per cent. solid, £10 10s.; broken, £11 10s. per ton, in drums.

COAL TAR PRODUCTS, ETC.—There is nothing to add to the comments in our recent reports on this market. Supplies continue to be very restricted, with the continuance of the coal mining dispute. Most prices are nominal. ANILINE OIL is quoted nominally at 9½d. to 10d. per lb., in loaned drums, carriage paid. It is believed import licences have been granted to some consumers. ANILINE SALT, 9½d. to 10d. per lb., packages extra, carriage paid; nominal: supplies scarce. BETANAPHTHOL shows no change, with the price nominally at 1s. per lb., carriage paid. Supplies lacking in quantity. TOLUOL is again dearer on the nominal quotation: pure, from 2s. 6d.; commercial 90's, 2s. to 2s. 3d. per gallon, ex works. XYLOL continues to be quoted at about 3s. 6d. for pure and 2s. 9d. to 3s. per gallon, ex works, for commercial 90's; market nominal. CARBOLIC ACID crystals are rather firmer this week, with the price about 4⅞d. per lb. f.o.b. in quantities. CRESYLIC ACID is very scarce and nominal, with pale 97 to 99 per cent. quoted up to 2s. to 2s. 1d. per gallon f.o.b. in quantities. CREOSOTE OIL is firm with very little available: ex works, 6⅞d. to 7d.; f.o.b., 7¾d. per gallon, in bulk quantities. NAPHTHALENE is firm and in better enquiry: powder, £13 10s.; balls, £14 17s. 6d.; crystals, £13 7s. 6d. per ton, in cases, ex wharf. Pure METHYL ALCOHOL is steady but quiet: one-ton lots, £47 in drums, ex wharf. Cheaper prices for quantities to arrive. PYRIDINE remains dull with material offered at about 17s. per gallon f.o.b. PITCH shows a further advance, and the market is very strong for this time of the year: quoted at 90s. per ton, f.o.b. East Coast; nominal.

Fixed Oils, etc.

OVER the holidays this market has been very dull, the only exception being linseed oil, which has been quite active at times and continues firm. ACID OILS.—Business remains poor and prices unsteady: coconut palm kernel, 41s.; groundnut, 36s.; soya, 33s. spot. CASTOR continues quiet but steady: pharmaceutical, 49s. 6d.; first pressings, 44s. 6d.; second pressings, 42s. 6d. spot, in barrels in not less than one-ton lots. COCONUT is steady: deodorised, spot, 53s. 6d.; Ceylon, 45s. 9d. c.i.f.; Cochin, 52s. c.i.f. COTTON is quiet and easy: deodorised, 50s.; common edible, 48s.; soapmaking, 45s. 6d.; crude, 42s. 3d. spot. GROUNDNUT.—Deodorised is steady but dull at 55s spot; crude Oriental, 49s. c.i.f. PALM KERNEL.—Market remains dull: deodorised, 48s. 3d.; crude, 45s. 6d. spot. PALM.—Business has been very quiet during the past week, and prices for some grades are again easier: Lagos, 37s. 6d.; softs, 37s.; mediums, 37s. 6d.; hards, 37s. 9d.; bleached, 40s. spot. RAPE is nominal and business lacking: refined, 55s.; crude, 53s. spot. SOYA remains dull and easier: deodorised, 44s. 6d.; crude, 41s. 6d. LINSEED (raw, naked) rules firm at slightly higher prices; business has been good: on spot, 36s. 3d.; August, 35s. 3d.; September-December, 35s. 4½d.; January-April, 35s. 10½d. Boiled oil, 37s. 9d. spot. Hull, on spot, 35s. 9d.; August, 35s. 9d.; September-December, 35s. 9d.; January-April, 35s. 9d. TURPENTINE has fluctuated considerably with an uncertain tendency without, however, experiencing any important alteration on balance. Demand before the holidays was fairly active, and prices improved but relapsed at the beginning of this week on freer offerings for forward delivery, while the trade demand slackened off. Deliveries for last week were satisfactory, amounting to 1,878 barrels, making an aggregate of 68,549 barrels since January 1, this comparing with 56,726 barrels for the same period last year. The stocks were returned at 13,463 barrels, which, including the quantities afloat, made the London visible supply 19,963 barrels, against 29,662 barrels. Spot closed at 63s., and August-December at 64s. 6d. per cwt. RESIN ruled generally firm, while the current receipts in America are said to be very well absorbed at full prices, and the statistical outlook is in favour of the maintenance of high prices. C.i.f. terms for American B/D were at 29s. 3d., for F. to M., 30s. 10½d., and N/WW 33s. per cwt., and a premium of about 9d. is wanted for parcels on the spot. WOOD.—Hankow in barrels on spot is steady at about 70s., with little business being done.

Exchange Rates on London

The following is a list of Continental and other exchange rates against the pound sterling on London prevailing at 4 p.m. on Wednesday:—

Place	Method of Quoting	Par of Exchange	July 28	August 4
Amsterdam ..	Fl. to £	12.107	12.09⅜—12.10	12.10⅜—12.11
Berlin ..	M. to £	20.43	20.42—20.42½	20.42—20.43
Brussels ..	Fr. to £	25.22½	198—199	170—171
Calcutta ..	Per rup.	24d.	17 3/16d.—17 1/16d.	17 1/16 i.—17 3/16d.
Constantinople	Pst. to £	110	865—885	845—860
Copenhagen ..	Kr. to £	18.159	18.34—18.36	18.32—18.34
Greece ..	Dr. to £	25.22½	438—442	437—442
Hong Kong ..	T.t. $	—	26 3/16 l.—26 5/16 d.	26 1/16 d.—27d.
Italy	Lire to £	25.22½	148½—149	145—145½
Kobe	Yen	24.58d.	23 9/32 d.—23 5/16 d.	23 3/8 l.—23 7/16 d.
Lisbon ..	Escu	53¼d.	2 3/4 d.—2 3/4 d.	2 3/4 d.—2 3/4 d.
Madrid ..	Pes. to £	25.22½	31.72—31.74	32.18—32.22
Montreal ..	$ to £	4.86⅔	4.85⅞—4.85¾	4.85½—4.85⅔
New York ..	$ to £	4.86⅔	4.86 7/16—4.86 7/16	4.86 1/4—4.86 5/16
Oslo	Kr. to £	18.159	22.17—22.19	22.18—22.22
Paris	Fr. to £	25.22½	202½—203½	167—167½
Singapore ..	Per dol.	—	27 1/16 d.—27 3/16 d.	27 1/16 d.—27 3/16 d.
Sofia	Lev. to £	25.22½	22.17—22.19	665—680
Stockholm ..	Kr. to £	18.159	18.16—18.17	18.16½—18.17
Switzerland ..	Fr. to £	25.22½	25.12—25.13	25.12½—25.13½
Vienna	Sh. to £	24.02	34.38—34.43	34.40—34.43
Warsaw ..	Zloty to £	25.22½	43—47	43—47

Correspondence

Letters for this section should be written on one side of the paper only. Correspondents may adopt an assumed name for purposes of publication, but must in all cases furnish their real name and address to the Editor.

Meeting Competition

SIR,—There are several points in the letter of Justin Lincoln (*C. & D.*, July 31, p. 224) which should be very useful to any chemist who suddenly finds himself confronted with the competition of a multiple concern and who, thinking there is business to be done, decides to open in his neighbourhood, very often right opposite to him. It may seem paradoxical to say so, but, given a man with pluck, it often turns out to be the finest thing that happens to him. Many men get into a kind of rut and jog along slowly, depreciating all the time, and the opening up of a serious competitor means make or break. I agree with your correspondent that, tackled in the right way, the immediate competition of a multiple concern can be inducive of increased business, but the stores must be met on their own ground. Dusting and cleaning seem thankless and interminable tasks, but a scrupulously clean shop is indispensable to a chemist, and well-illuminated windows and a bright interior are also necessary to give one's customers a good impression. Once the customer is induced to enter the pharmacy the chemist who knows his business should have no difficulty in making him or her a permanent one. Here and there one comes across the person who is never satisfied with anything or any price; it may be ungallant to say so, but my experience is that this type of customer is generally of the female sex; but, taking the shopping public as a whole, they are quite satisfied with a square deal, recognising that you are there to earn a living, and if they think there is any cause for complaint are generally content with a reasonable explanation. Another point mentioned by "Justin Lincoln" is that of the man who tries to do all the work himself. To the man who has founded and built up a business it is perhaps a little excusable that he should get the habit of thinking that no one else can do it quite so well as himself, but for the man who is in a position to employ assistants it is a mistake. He should leave the routine work to his employees and utilise his own time partly in seeing that they do it, but largely in general direction, buying, thinking out and organising fresh developments. This he is quite unable to do if he muddles about doing a little counter work, then a little dispensing, packing stock, book-keeping, and even as I have seen some men do, start bottle washing, with the result that he does nothing properly except interfere with his staff. Discount is a rock over which we are all liable to stumble, and to accept the wholesalers' temptations without calculating what the figures really mean. Similarly with regard to the inducements afforded by extra goods, which we afterwards find are shelf stickers, but when it comes to offering a presumably educated man a cigar as a bait to place an order, I have serious thoughts of closing the pharmacy and touring the country fairs "knocking them down." I might get a coconut as well.

Yours faithfully,

COCONUCIS (31/7).

Legal Queries

C. P. C. (24/7).—The recommendation of a preparation for use in pyorrhœa would render the article liable to medicine-stamp duty.

Ireland (28/7).—It would be illegal in Ireland for a limited company to carry on the business of a pharmaceutical chemist in the circumstances you mention.

A. H. T. (29/7).—It is not possible to state whether the alternative way of dealing with the damage done to your house by a motor would have been more expeditious than the one you adopted.

G. F. (20/7).—The use of a brand name for a series of "known, admitted and approved" remedies does not render the articles liable to medicine-stamp duty.

J. G. (23/7).—The interpretation of the English law is that "Model Pharmacy" is a place name and not the name of a person. The Irish law is built on this, and the name of the qualified chemist who is *bona-fide* responsible for the sale of poisons is the "name of the seller."

J. A. F. (West Africa) (8/7).—The registration of the name of a proprietary medicine as a trade-mark is the best protection for the article. The process of registration is explained in the *C. & D. Diary*, 1926, p. 309. This can be carried out direct or through a trade-mark agent. It would be cheaper to employ an agent in your case.

T. D. C. (28/7).—The recommendation of the plaster for the cure of corns renders it liable to medicine-stamp duty. On the handbill a note of the composition of the plaster is given, but to convert the article into a "known, admitted and approved" remedy these details must be given on the label, or alternatively a reference to the formula in a standard work.

H. J. G. (23/7).—Only a qualified person can carry on the "business of a chemist and druggist," and the use of the designation "pharmacy" by an unqualified person would in case of a prosecution probably be part of the evidence that the business of a chemist and druggist was being carried on. A case on these lines has not so far come before the law courts.

D. G. S. (20/7).—A partnership in England does not come under the term a "body corporate." The optician would render himself liable to penalties for "keeping open shop" for the sale of poisons if the two names were held out as carrying on the business of a chemist and druggist. He could not be an authorised person under the Dangerous Drugs Act regulations.

J. M. R. (19/7).—The line of demarcation between a food and a medicine chargeable with stamp duty is not always clearly shown. The fact that medicaments are combined with the article, that certain dosages are observed, and that the article is recommended for the alleviation or cure of ailments are considerations which decide the question. Sanatogen, for example, is a food, although it contains a small proportion of glycerophosphates, because the casein is the main feature and is a food. It may not, however, be possible to claim the same exemption for a biscuit containing tonic properties.

Retrospect of Fifty Years Ago

Reprinted from "The Chemist and Druggist," August 15, 1876

Methylated Liniments

At a meeting of the Council of the Pharmaceutical Society on August 2 Mr. Hampson drew attention to a general order recently issued by the Board of Inland Revenue to the effect that the use of methylated spirit was only to be legal in the preparation of soap and compound camphor liniments. This would prevent the use of methylated spirit in the manufacture of aconite and belladonna liniments, which were largely used in hospitals and such institutions. This order, if carried out, would occasion a confiscation of considerable stocks of these liniments, and would be oppressive to the poor, who would be practically precluded from the use of these valuable medicines. He suggested that the president and vice-president of the Society should see the Inland Revenue authorities on the subject. Mr. Stacey said he had received a communication from the Board withdrawing the permission, which they had granted him in 1869, to prepare these liniments with methylated spirit. He believed the Board had issued this order in consequence of the very few persons, not more than one or two besides himself, who had applied to them for permission. After some further discussion it was arranged that the president, Mr. Stacey, and the secretary, should wait on the Commissioners of Inland Revenue in reference to this new regulation. Mr. Mackay suggested that chemists would do well to abstain from dealing in the prohibited liniments, at least until the result of the projected interview should be known.

THE CHEMIST AND DRUGGIST

COMMERCIAL COMPENDIUM

deals with the trade side of pharmacy

[Commenced *C. & D.*, July 5, 1924]

Gingergrass Oil.—Up till fairly recently gingergrass oil, one of the Indian grass oils, was regarded as an adulterated palmarosa oil. It is, however, now known to be a pure essential oil, *sui generis*. It appears that the grass, *Cymbopogon Martini*, exists in two forms, whose exact botanical differences have not yet been established. The natives call the grass rosha or rusa grass, and the *Sofia* form yields gingergrass oil, while the *Motia* form yields palmarosa oil. The grass grows freely on open hillsides in West Khandesh, especially in Akrani. The most important localities where rosha oil (i.e., the two oils) is obtained in the Bombay Presidency are North, East and West Khandesh, the North and South Lasik divisions of the Central Circle, and to a less extent from the Surat Dangs and Panch Mahals divisions of the Northern Circles. The oil is distilled in a very primitive manner by direct fire-heated stills. The flower and leaf, with small portions of the stem, are used for distillation, and usually two crops are gathered every season. The total output of the two oils reaches up to 120,000 lb., or even more at times. Both the *Sofia* and the *Motia* oils are used all over India for the manufacture of native "attars." The *Motia* oil is used on a small scale for adulterating what little native otto of rose is distilled. As found in the native markets the oil is usually adulterated, generally with a fatty oil, such as linseed or rape oil. In a recent publication of the Indian Forestry Department R. S. Pearson states that "it requires no very deep knowledge of the rosha grass industry to arrive at the conclusion that the business is not being carried on to the best advantage of everyhody concerned. Everything points to the desirability of introducing steam-distillation plants, not only in order to obtain a greater quantity of oil from a given quantity of grass, but to reduce the cost of production hy a saving in fuel and labour." Gingergrass oil has the following characters: Specific gravity, 0.900-0.955; optical rotation, −30° to +50°; refractive index, 1.4780-1.4950; acid value, 2-6°; ester value, 8-55°; ester value after acetylation, 120-200. The oil is not usually soluble in three volumes of 70 per cent. alcohol. It contains the terpenes, dipentene, limonene, and phellandrene, as well as geraniol, perillic (hydrocumic) alcohol, carvone, and an aldehyde not yet characterised. Gingergrass oil is imported in pots holding up to 250 lh. each, and is used in perfumery, especially in the perfuming of soaps. (*See also* Palmarosa oil.)

Ginseng.—The Jên-shen of the Chinese is one of the oldest, most highly esteemed, and highest priced of any drug in China. The plant yielding the root is *Panax Ginseng*, C. A. Meyer, N.O. *Araliaceæ*. That it forms a considerahle item in commerce in that country may he understood from the fact that no less than eleven varieties of the drug are enumerated in the Chinese Customs Yellow Book; these include not only the root, but also root cuttings and beard, native ginseng refuse, cultivated ginseng refuse, inferior native ginseng, and imitation wild ginseng. Mr. J. H. Wilson, of Shanghai, gave an interesting account in the "Pharm. Journ.," July 7, 1888, p. 2, of the principal grades of the drug, and presented samples of them to the museum of the Society at the same time. He says that the *wild* plant, Yah-shan-shên, is the most esteemed, and that as much as £15 (60 taels) is sometimes paid for a single root not larger than the little finger. The *cultivated* plant (Lien-teng-shen) in the northern provinces of China and in Manchuria is grown on damp sheltered places on mountain-sides. The plant is of very slow growth and not fit for use until it is five years old. Korean ginseng (Lao-Li-shên) comes next in value, costing ahout 21s. to 40s. lb. The Japanese ginseng (tong-yan-shên) is imported in considerable quantities into China. The American ginseng is derived from an indigenous species *Panax quinquefolium*, Linn. (an inferior variety), now largely cultivated in North America for exportation to China, principally to Shanghai; also for the use of the Chinese population in the United States. Even in this country it is obtainable at about 40s. a lb. from wholesale herhalists. Attempts have been made in this country to cultivate it, but, like *Hydrastis canadensis*, the price obtained does not compensate the trouhle necessary in its cultivation, special arrangements having to be made to give it the proper degree of shade and moisture, and the slow growth of the plant and the liahility to he attacked by slugs rendering it by no means an easy plant to cultivate under ordinary conditions. In Europe the medicinal properties of ginseng are usually regarded, like those of coca leaves were about a century ago, as "travellers' tales," but no trouble has been taken to throw light by chemical or physiological investigations on any active principles it may contain, although by the Chinese it has been held for ages in the highest estimation. But Europeans who have lived in China are mostly of the same opinion as one of the United States Consuls in Korea, who states that from personal observation and experience he is satisfied that it is an active, strongly heating medicine, and that caution is sometimes required in its use, as it occasionally causes boils and eruptions and sleeplessness and flushing ("Year-Book of Pharmacy," 1887, p. 152). It is used by the Chinese in cases of extreme debility when a cardiac tonic is required, and is used like musk sometimes is in Europe to prolong life in its last moments for legal purposes, as in the making of a will. The demand for Manchurian ginseng at one period became so great that its extinction was threatened and a law had to be passed to prohihit its collection. Most of the ginseng output of Korea is shipped to China, though a quantity is taken by Japan. It is of interest to note that the Chinese pay for Korean ginseng seven times the price they pay for American ginseng, and thirty times the figure at which they value the product of Japan. The greatest part of the trade in China is inter-provincial, hut a considerahle amount is shipped to Hongkong, while, strangely enough, Japan and Korea are also large importers. Since the annexation of Korea hy Japan, the cultivation of ginseng has been placed upon a more scientific and practical basis, the production has heen increased and the quality improved. However, the wild variety is still esteemed to he hetter than the cultivated plant by the Chinese. The suggestion has been made that the fact that the root is often forked may account for the attrihution by the Chinese to ginseng of the aphrodisiac qualities it is supposed to possess.

Glanders Regulations.—*See* Animals' Diseases Acts.

Glasgow University: Pharmacy Degree.—In 1907 the University of Glasgow instituted the degree of hachelor of science in pharmacy (B.Sc.Pharm.). Candidates must first pass the Preliminary examination in science, and are required to attend not less than seven courses of instruction as prescrihed. The two examinations are: First Science Examination in mathematics (or biology), natural philosophy, and chemistry; Final Science Examination in chemistry, botany, materia medica, and pharmacy. Before entering for the Final examination, candidates must produce evidence of heing registered chemists and druggists or graduates in medicine. The registrar of the University is Mr. Robert Brough.

Glass Shelves.—For display purposes in the window there is nothing better than plate-glass shelving. When the window back is fitted with standard-bars and interchangeable brackets it is a good plan to have a reserve set of plate-glass shelves in stock, of different shapes and sizes from those in use, which will enable the chemist to produce quick changes in the arrangement of the window setting. By the use of adjustable hrackets of different widths, in conjunction with the standard-bars, a change of the glass shelving is easily and quickly effected, and it is then unnecessary to leave the window bare of display

The C.&D. Commercial Compendium

while the shelves are being cleaned. Thus much time is saved in the dressing, and the selling powers of the window are not suspended. It is generally advisable to have the shelves of graduating widths, tapering towards the top. Two or three shelves combined with a display on the window base will usually be found sufficient to provide a fairly comprehensive show. For use in conjunction with pedestals and other display stands, oval or round plate-glass shelves make attractive bases for the exhibition of all classes of goods. Being interchangeable, they provide the retailer with scope for endless variation of his window setting. Circular shelves are also obtainable for use on hook-suspenders hanging from cross rods or bars at the top of the window. They also provide facilities for extensive display if used in conjunction with tier or step stands in the window or on the counter. If glass display counters or showcases are used in the shop, adjustable glass shelving arranged on suitable bars and brackets provides scope for the extensive interior exhibition of goods; and if at any time it is desired to show more bulky lines, the shelves and brackets can easily be removed for the time being.

Glass, is ordinarily an amorphous transparent substance, breaking with a conchoidal fracture, and formed by fusion of silica with an alkali and an oxide. The prevailing view is that glass corresponds to a supercooled liquid whose high viscosity prevents crystallisation. Commercial glasses contain at least three components—e.g., lime-soda-silica or bottle-glass, consists essentially of calcium and sodium silicates. The introduction of the oxide of a divalent or trivalent metal (CaO, PbO, Al_2O_3, or B_2O_3) would appear to confer resistance to solvent action of water upon a simple alkali-silicate such as sodium silicate, but there is no evidence that glass consists of definite chemical compounds. Thus, lime-soda or bottle glass, with composition $6SiO_2$, CaO, Na_2O, possesses great stability, but the proportions of lime and soda may be varied considerably without danger of crystallisation (devitrification) or loss of weathering properties (resistance to action or water) so long as the silica content remains about 72 per cent. Decrease of alkali and addition of boric oxide results in harder (infusible) chemically resistant glasses, until pure silica glass (fused silica ware) is obtained. On the other hand, addition of lead oide (up to 30 per cent.) yields softer dense glass of great brilliancy owing to its high refractive index. This is known as lead or "crystal" glass, and is used for cut-glass ware. Glasses containing more than 15 per cent. of monovalent alkali (Na_2O or K_2O) become dimmed with long exposure to ordinary atmospheric conditions. Resistance to action of water is bestowed upon glass by the oxides SiO_2, B_2O_3, Al_2O_3, ZnO, and PbO; whilst acid-resistant properties are increased by inclusion of SiO_2, Al_2O_3, CaO, B_2O_3, and ZnO. Alumina (Al_2O_3) aids against attack of alkali. Other oxides, such as phosphoric oxide, barium oxide, and thallium oxide are used in making special (optical) glasses. In addition, fluxes (such as fluospar, sodium nitrate), decolorisers (manganese dioxide, arsenic) and colouring metallic compounds (chromium, cobalt, copper, gold, iron, nickel, manganese, uranium) are utilised for speeific purposes in the manufacture of glass. Sand is the basic material controlling the quality of glassware, according to the amount of iron it contains; thus, for optical glass or tableware, it should not be greater than 0.03 per cent. or 0.5 per cent. respectively, but 0.1 per cent. is permissible for chemical glassware. For green bottle-glass 2 per cent. or more of iron may be present in the sand and be advantageous as a flux. However, the tendeney is towards white glass for all purposes, whether for bottles or windows, and this object is better served by white sand than the use of colour correctors (such as manganese dioxide). Though chemical and optical glass is still made in pots, the advent of machines for working glass has lead to their supplantation by tank furnaces in modern glass manufacture, whether this relates to bottles, jars, pressed glass, window-glass, plate-glass, or rolled glass. The following are typical examples of modern glasses as regards eomposition, properties, and uses:—

Bottle-Glass contains 70 to 75 per cent. silica and 25 to 30 per cent. soda and lime (either Na_2O and CaO varying reversibly from 7 per cent. to 17 per cent.). Alumina (0.5 per cent. to 4.5 per cent.) and magnesia (0.17 per cent. to 6 per cent.) are normally present as impurities in the limestone; and iron (0.1 to 2.0 per cent.) from the sand used.

Window-Glass and plate-glass are very similar to bottle-glass in composition, but vary less in range of constituents (which approximate closely to 72 per cent. SiO_2, 14 per cent. Na_2O, and 12 per cent. CaO).

Chemical Glassware for beakers and flasks consists nowadays of boro-silicate glasses containing also alumina and usually zinc. Such glass resists corrosive action of water and acid and withstands sudden heating or chilling owing to its low coefficient of expansion. The composition of British, German and American chemical glassware, given by Professor W. E. S. Turner, is as follows:—

	British		German		American	
	I	II	Jena	Greiner & Friedrich	Pyrex	Nonsol
SiO_2 ..	66.51	66.38	64.58	66.62	80.62	68.03
Na_2O ..	11.52	10.02	7.33	11.76	3.83	11.18
B_2O_3 ..	4.57	6.92	10.03	3.74	11.90	5.81
Al_2O_3 ..	6.74	6.60	6.28	3.11	2.00	2.62
ZnO ..	3.62	8.66	11.78	8.20	—	7.39
Fe_2O_3 ..	0.08	0.12	0.10	0.14	0.14	0.20
CaO ..	4.35	0.49	0.08	0.20	0.22	0.80
MgO ..	0.33	0.12	0.12	3.29	0.29	0.41
K_2O ..	2.58	1.09	trace	1.40	0.61	0.39
MnO ..	0.10	trace	trace	0.13	trace	trace
				(1.80 Sb_2O_3)	(0.66 As_2O_3)	(0.45 Sb_2O_3)

Lamplown Glassware for making chemical apparatus with glass joints (condensers, absorption bulbs, pipettes) contains more alkali (usually in place of boric oxide) for ease of working in flame, but the composition varies with class of apparatus. Special soft sealing in glasses consists of lime-soda glass fused with zinc oxide and boric acid. Jena (normal) glass is used for thermometer bulbs, and has a high content of silica and alumina. Boro-silicate glass is employed for high-range temperature thermometers. Crystal (lead) glass is used for stems of British clinical thermometers. Lead glass is used for sealing-in wires (for wireless valves, electric light bulbs, etc.).

Fireproof Glassware for cooking consists of pressed articles of high-silica glass, such as Pyrex glass above.

Heat-resisting Glassware may be potash-lime glass, as in the case of Kavalier eombustion tubing (79.5 per cent. SiO_2, 7.8 per cent. CaO, and 11.6 per cent. K_2O), or boro-silicate glasses similar to chemical glass.

Table ware and electric light bulbs consist of lead glass (SiO_2 55 per cent. to 65 per cent., PbO 17 per cent. to 33 per cent., Na_2O, 2 per cent. to 12 per cent.).

Optical glasses are graded according to density (light, medium, dense, etc.) and dispersion into "crown" or "flint" glass. The latter, which contains lead, is highly refractive and has the greater dispersion. Glass containing barium, zinc, borie aeid, etc., is specified as barium crown, zinc crown, etc. Tinted glasses for absorbing actinic (light or heat) rays contain oxides of iron, cerium, or chromium.

Strengthened Glass is made on a large scale and is used for a variety of purposes. This may have crimped wire mesh embedded in rolled glass, or eonsist of celluloid between two thin layers of glass. Pavement lights are rendered extremely hard by rapid chilling.

The operations of making glassware are becoming more and more speeialised by the introduction of machinery for glass blowing, whilst scientifie annealing (or regulated cooling) of glassware is conducing to greater stability in modern glassware, the production of which has grown into a highly technical industry.

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Pharmaceutical Society of Great Britain

85th ANNUAL MEETING, Held June 9th, 1926

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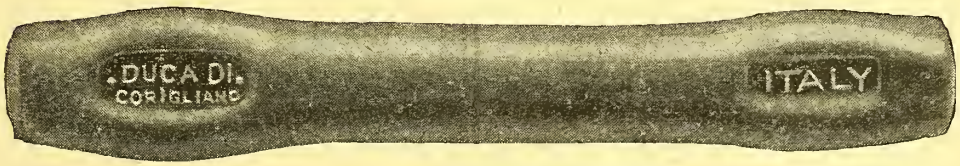

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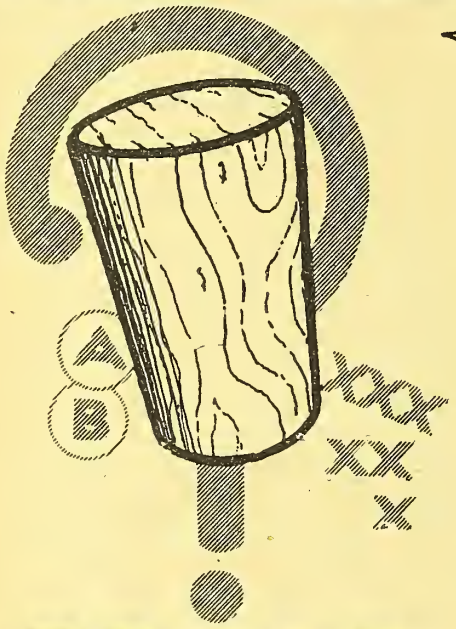

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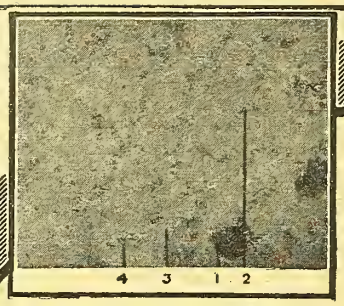
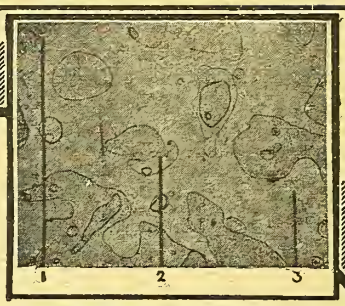


Micro-photograph of stool after Petrolagar administration, showing complete emulsification and thorough admixture with intestinal content.
(1) *Epithelial Cells* (2) *Microscopic Oil Globule* (3) *Agar-Agar Granule* (4) *Fæces*



Micro-photograph of fæces after administration of plain mineral oil, showing complete absence of emulsification; this explains why mineral oil always leaks.
(1) *Epithelial Cells* (2) *Oil Globule* (3) *Fæces*

Petrolagar

(trade mark)

(DESHELL)

FOR CONSTIPATION.

THE micro-photographs clearly demonstrate the superiority of Petrolagar over ordinary liquid paraffin in the treatment of constipation. On the left the perfect admixture with the intestinal content obtained with Petrolagar is apparent; the other photograph, in which large unemulsified globules of oil are present, explains at a glance why plain mineral oil never has solved and never can solve the problem of constipation. It also shows why mineral oil leaks.

The drawbacks inseparable from the use of plain liquid medicinal paraffin are well known. Many patients cannot tolerate its insipidity; digestive disturbances sometimes occur; whilst thorough admixture with the intestinal content is seldom attained, with consequent leakage from the rectum.

Petrolagar contains 65% of purest mineral oil with an Agar emulsifying agent, prepared from 1½% anhydrous agar, forming a perfectly stable, homogeneous and highly palatable emulsion.

There is no taste of oil, so that the most fastidious patients take the product readily. In the treatment of chronic constipation, Petrolagar gives results unobtainable by any other method and breaks the vicious circle set up by the habitual use of drastic purgatives. The medicinal paraffin is so finely divided that it is thoroughly disseminated throughout the fæcal mass, thus leakage is almost entirely eliminated; the agar-agar is specially prepared so as to yield on incubation in the intestinal tract many times its original bulk, forming a bland gelatinous mass which is completely and readily eliminated, acting indeed, as a soothing emollient to the inflamed intestinal mucosa.

As contrasted with cathartics, Petrolagar is non-habit forming, and once normal elimination has been restored may be given in diminishing quantity.

Issued in Pound and Half-pound sizes as follows:—

PLAIN (No. 1)
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THE CHEMIST AND DRUGGIST SUPPLEMENT

42 CANNON ST. LONDON E.C.4

AUGUST 7, 1926

This Supplement is inserted in every copy of The Chemist & Druggist.

CHEMISTS' TRANSFERS.

Messrs. Orridge & Co., 56 Ludgate Hill, E.C.

Telephone No.: CITY 2283.

May be consulted at their Offices on matters of Sale, Purchase and Valuation.

1.—EALING (Near).—Old-established Family, Retail and Dispensing Business; returns about £2,000 per annum, with scope for increase; double-fronted shop, well stocked; living accommodation; held on lease; price £1,600.

2.—LONDON, S.E.—Good-class Family, Retail Business; returns, present rate, £1,600 per annum; gross profit £600; small, single-fronted lock-up shop, well stocked; no serious opposition; price £750.

3.—ESSEX (Few Miles Out).—General Retail and Dispensing Business; returns between £20 and £25 per week, increasing; lock-up shop, attractively fitted; good working stock; long lease; moderate rental; price £850, approximately the value of the stock and fixtures.

4.—LONDON, N.—Old-established Business situate in densely-populated district; returns £1,250, at full prices; scope for large increase; living accommodation in good state of repair; lease 10 years to run; rent £65. Further details on application.

5.—SOUTH LONDON (Main Road).—Cash Drug Stores, with very good opening for N.H.I. Dispensing and Photographic; present hands 16 years; returns £755; single-fronted shop, with living accommodation and garden; held on lease; price for quick sale £500, or near offer.

6.—LONDON, W.1.—Ready-money Business; returns for financial year just ended £1,651; net profit about £700; double-fronted shop, well fitted and stocked; net rent about £80 per annum; held on lease; price £1,500 or near offer entertained.

7.—LONDON, N.W.—Family, Retail and Prescribing Business, with good opening for Photographic; returns £17 weekly, increasing, at good prices; single-fronted shop; rent £52 per annum; no near opposition; price £300, or near offer entertained.

8.—SALOP.—Very old-established Business, with Kodak Agency; entirely unopposed; returns average £30 per week at top prices; good house and garden; new lease will be granted; net rent, £23 per annum, or property may be purchased; price for quick sale, £900.

9.—MIDLANDS.—General Retail Business, with Wine and Spirit Licence; returns between £1,700 and £1,800 per annum; net profit, £570; new lease will be granted; rent, £36; stock and fixtures estimated to be worth £900; price, £1,250.

10.—HOME COUNTY.—Old-established General Retail Business, with Branch; owing to Vendor's ill-health the returns have fallen away, last year being £2,600; both premises are rented at £40 per annum; long leases; would sell separately if required; further details on application.

11.—EASTERN COUNTY.—Very old-established Business, offering scope for increase under energetic management; returns last year, £2,600; heavy stock; large house, with ground at rear; garage, new lease will be granted; offers invited.

12.—POPULAR HEALTH RESORT (Inland).—General Retail and Dispensing Business, with Wine Licence; returns, £1,500; gross profit, 35 per cent.; double-fronted shop, well fitted and stocked; small living accommodation; rent, £65; further details on application.

13.—DEVON.—Medium-class Business, Dispensing, Prescribing, and Photographic; returns average £1,450, with scope for increase in young, energetic hands; double-fronted shop; good working stock; small living accommodation; low rent; price £750.

14.—HERTFORDSHIRE.—General Retail Business, with Kodak Agency, and very remunerative side-line; returns, £25 weekly under management, with scope for large increase; double-fronted corner shop; living accommodation; 21 years' lease; price, £475, the estimated value of stock and fixtures.

Messrs. O. & Co. desire to emphasize the necessity of a Periodical Statement of Account by which means alone Profit, the value of Business, &c., can be determined. Involving as this does the labour of Stocktaking and Valuation, it is often omitted and eventually becomes confusion and loss.

Valuations for Stocktaking

Messrs. O. & Co. are prepared to undertake these essential duties and make Special Terms for such service.

ORRIDGE & CO., 56 LUDGATE HILL, LONDON, E.C.4

BUSINESSES FOR DISPOSAL.

BERKSHIRE.—Genuine old-established Mixed R.M. Country Business for disposal; returns last year £2,800; profit £700; large freehold premises, 40 ft. frontage main road; garage, tennis lawn and good garden; price, inclusive, £3,000. Full particulars, "Pharmacy," 172/13, Office of this Paper.

KENTISH COAST (popular seaside town). — Pharmacy, centrally situated, offering splendid scope; thickly populated residential and letting district; only Chemist in locality; returns steadily increasing; now £23 per week; established this year; 19-year lease; rent £45 per annum; comfortable house; newly decorated; six rooms, kitchen and garden; electric light; price £950; £800 cash, remainder by instalments. 172/11, Office of this Paper.

MANCHESTER. — Successful old-established, good-class Chemist's Business; lock-up; main road; splendid position; returning £40 weekly; low rent; lease; price £1,250; also Branch, with good living accommodation, returning about £25 weekly; price £750; will sell together or separately. Another exceptional offer; 3d. car ride town; returning £30 weekly cash, excluding 1,200 N.H.I. scripts monthly, increasing; very heavily stocked; Kodak Agency; electric light; good house; price, including property (vendor's own), £1,850. Can personally recommend these businesses. Brierley, Chemists' Valuer, 135 Queen Street, Newton Heath, Manchester. (Tel.: Failsworth 113.)

MANCHESTER (Gorton District). — Old-established Drug Stores, including property, stock, goodwill, fixtures, etc.; fitted electric; good family house; good stand for N.H.I.; no opposition near; further particulars. 173/34, Office of this Paper.

NORTHUMBERLAND.—Excellent little Business; established 2½ years; takings for second year £809 (exclusive N.H.I.); excellent opportunity for young qualified man; no chemist shop within 4 miles; lock-up Pharmacy; excellent opening for Panel; price £300 for stock and goodwill. Dewhirst, Lynemouth Pharmacy, Lynemouth, near Ashington, Northumberland.

SOUTH COAST.—Genuine Business for Sale; established over a century; average turnover £7,000 yearly; accounts audited; large double-fronted shop; heavy stock; Seller's own freehold; lease might be arranged; price, to include premises, £9,750. Apply "Seaside," 87/904, Office of this Paper.

S.W. DISTRICT.—For immediate Disposal, Double-fronted Lock-up Shop, at present doing £20-£22 weekly, with increasing turnover; good Photographic business; rent 15s. weekly; price £400, including good saleable stock valued approximately £250; business presents unique opportunity for Chemist desiring a paying concern involving minimum outlay; no offers, no agents. All communications to J. Hodson, 162 Sutherland Avenue, W.9.

AN opportunity occurs to acquire a Pharmacy in growing neighbourhood of South Coast town; lock-up shop; moderate rental; increasing returns; suit qualified or unqualified; price £350 or offer for quick sale. 87/908, Office of this Paper.

EXCEPTIONAL opportunity in pleasant garden suburb of Manchester, where hundreds of houses are being erected, in addition to over 1,500 already built; a recently-established Business, doing a good middle-class trade of over £1,600 per annum, all cash; small N.H.I.; no immediate opposition; Kodak Agency; owner's health sole reason for selling. 169/37, Office of this Paper.

RARE opportunity for young Chemist; turnover £1,100; value of fixtures and stock, £500; long lease, low rent; considerable scope in capable hands; modern fittings; very profitable; situated in suburb large town Gloucestershire; intending purchaser must be prepared to visit and examine same in order to negotiate promptly. 174/3, Office of this Paper.

UNDER DEED OF ASSIGNMENT.—Immediate offers are invited for Chemist's Business, lock-up, situate shopping centre of busy main road, Manchester. For further particulars and order to view apply quickly in first instance to Brierley, Chemists' Valuer, 135 Queen Street, Newton Heath, Manchester. (Tel.: Failsworth 113.)

£135 DOWN, balance by arrangement; no goodwill; no opposition; Cash Chemist's single-handed shop, 10s. weekly clear; N.H.I., Kodak, Prescribing; plenty scope; healthy growing district near Sheffield; come and see it. 172/37, Office of this Paper.

The Association of Mnfg. Chemists

— LIMITED —

Business Agency Transfer and Valuation Department,

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PARKIN S. BOOTH, *Accountant and Valuer.* *'Phone : City* 1261-2-3

BUSINESSES FOR DISPOSAL

1.—LONDON, S.W.—Unique opportunity to acquire Cash Retail Dispensing Business, established over a century; centrally situated in busy shopping thoroughfare; lock-up shop, with store room above; lease 13 years at £100 p.a.; returns approximately £50 a week under management; good scope for increase under personal supervision; well fitted and good stock carried; price for quick sale, £1,750. (38)

2.—KENT.—Old-fashioned Chemist's Business, with living accommodation attached; splendid position in large town on main London to coast road; lease will be granted or freehold can be bought; Kodak Agency; £500 or nearest offer. For further particulars please write. (69)

3.—ILFORD.—Old-established Pharmacist's Business in densely-populated area; returns average £20 per week; good living accommodation and excellent scope for energetic proprietor; 3 years' lease, with option of purchasing leasehold property, with 58 years to run; rental 25s. per week exclusive; price for quick sale, £700. (50)

4.—LANCS.—Well-fitted, double-fronted shop in busy town; all cash; returns £800; N.H.I. average 400 per month; stock £250; Kodak Agency; Optical side average about £80; could be sold with or without this branch; purchaser would be taught; price £400 all at, or nearest offer. Further particulars will be supplied on application. (59)

5.—POPULAR EAST COAST SEASIDE RESORT.—Excellent empty shop premises shortly available; eminently suitable for high-class Chemist's Business, situated in centre of best trading area within few doors of multiple shops; attractive modern double-fronted shop, frontage 18 ft., depth about 34 ft.; rent, £200 p.a. under lease 5 to 21 years at option of tenant; full particulars on application. (45)

6.—YORKS.—Well-fitted double-fronted shop with good living accommodation; lease 5 years from buyer's day of purchase; rent, £52; returns, £500 all cash; good scope for increase by qualified man; goodwill, fixtures, fittings and stock, £275. (48)

7.—BRISTOL.—Cash Retail Dispensing Business; returns £1,130 p.a., under manager; could be considerably increased; double-fronted shop with lease, 13 years; corner position; bus stop; good house and stock rooms; growing suburb; rent £30; let off £20; price £290, plus stock at valuation, or nearest offer. (63)

8.—LIVERPOOL.—Old-established high-class Dispensing and Family Business, with valuable Proprietary in connection therewith; returns over £2,000 at approximately 62% gross profit; premises are held on lease, of which 12 years is to run at a rental of £180 p.a., rising to £200, with possibility of renewal for further period. Full particulars will be sent on application. (51)

9.—YORKS.—£900 will purchase large double-fronted Shop with Warehouse attached; on long lease, with nine years to run; returns £25 per week, nearly all cash; stock about £500; rent £50 first two years, then £60; season just commencing. Further particulars on application. (60)

10.—SURREY.—£750 will be accepted for Drug Store; established 20 years; double-fronted shop, with room at rear, well fitted and stocked; lease will be granted at rental of £78 p.a.; returns, £1,000 p.a.; all ready money; good scope for qualified man. (27)

11.—LONDON SUBURB.—Smart up-to-date Cash Drug Stores, East Ham; main road; prominent position; new double front; mahogany fittings; returns £27 10s. p.w., which could be doubled in qualified hands; Kodak Agency; owner, vendor, will grant 42 years' lease; specially recommended; price £1,050. (64)

12.—CHESTERFIELD.—Old-established double-fronted shop, 3 warehouses, house 6 rooms and cellars; lease can be obtained; returns, £34 per week, practically all cash; stock, £700; fixtures, fittings and goodwill, £550; price for quick sale, £1,100. (65)

13.—STOCKPORT.—Splendid opportunity to acquire a Business in main shopping thoroughfare; premises on lease; 7 years to run; rent £80, including rates; turnover £1,000 p.a., which can be considerably increased by smart man; no living accommodation; stock and fixtures about £650. (67)

14.—BRADFORD.—Retail Cash Dispensing Business, in main shopping centre; frontage of five windows; large corner shop, doing good-class business; Kodak Agency; splendidly fitted in modern style; rent high, but reasonable for position; exceptional opportunity for a go-ahead pharmacist; offered at low price as owner's time is fully occupied by business in another city. (58)

15.—LONDON, S.E.—Cash Drug Stores in busy main road, thickly populated district; turnover last year £755, all cash; could be doubled in qualified hands; no serious opposition; good living accommodation; large garden; quick sale, £500, or near offer. Write for further particulars and order to view. (66)

16.—KIMBERLEY, NOTTS.—Retail Cash Business situate in good-class neighbourhood; returns £700; rent £13 13s. and rates; all fittings, fixtures and stock new; ill-health reason for disposal. Write for further particulars. (68)

Stocktaking and Valuation of Businesses undertaken at moderate inclusive fee. Chemists are invited to consult us in respect of their requirements in connection with sale or purchase of businesses. Chemists in the North are requested to communicate with our Liverpool Offices.

BERDOE & FISH

WILLIAM S. FISH.

VALUERS AND TRANSFER AGENTS,

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(one minute from St. Pancras and King's Cross Stations).

1.—MIDLANDS (Health Resort).—Good-class Retail and Dispensing Business, with Kodak Agency, in splendid position; returns £1,500; excellent profits; plenty of scope; good house and pharmacy; very heavily stocked; price, £1,400.

2.—WORCS.—Unopposed Light Family Retail Business in select residential locality; beautifully situated and easily worked; returns £2,350; large house and garden; excellent stock; price £1,450, or offer; worth attention.

3.—ESSEX (Popular Seaside Resort).—Good-class Light Retail, with Kodak Agency; returns over £1,800, increasing; good profits; nice house and pharmacy; well stocked; price £1,300 for quick sale.

4.—HOME COUNTY (20 miles out).—Good-class Retail and Dispensing Business in growing residential town; returns last year £2,617; large house and garage; stock and fixtures worth £1,800; price £2,450, or offer.

5.—CLERKENWELL.—Profitable Cash Retail with Kodak Agency and N.H.I., returning £1,760 under female management; scope for increase; low rent on lease; house attached; books kept by chartered accountants; owner going abroad; price £1,250; strongly recommended.

6.—LONDON, S.W. (7 miles out).—Well-established Drug Stores; no near opposition; fine opening for N.H.I.; returns £1,000; double-fronted shop; well fitted and stocked; owner retiring; price £750.

7.—EAST HAM.—Sound Cash Drug Stores in very prominent position on main road; present returns £27 a week; can be much increased in qualified hands; house and garden; long lease granted at low rent; large attractive shop, modern fittings and good stock; price £1,000.

BUSINESSES WANTED.

Messrs. Berdoe & Fish are in immediate want of sound Businesses at prices ranging from £700 to £4,000, and cordially invite correspondence. We have a large number of genuine cash buyers waiting and are able to negotiate sales quickly and with the utmost privacy.

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VALUATIONS efficiently undertaken by fully qualified Staff.

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BUSINESSES WANTED.

SMALL Business, capable of development, with living accommodation; country town preferred. Full particulars (in confidence) to Miller, 50 Sherwood Road, Gt. Crosby, Liverpool.

WANTED to purchase a sound Chemist's Business, with living accommodation, good middle class, in a pleasant and healthy locality preferred, and making a net profit of at least £500 per annum. Replies, with full details (in confidence), to 172/19, Office of this Paper.

WANTED in busy town on or near South Coast, good-class Drug Store in main street; lock-up shop, with turnover of not less than £20 per week. Give full details in reply to 174/2, Office of this Paper.

PARTNERSHIP.

QUALIFIED Chemist, single, with capital, desires responsible position in retail business with view to Partnership or succession; over 20 years' first-class experience in Retail Pharmacy; North of England country business preferred. 171/10, Office of this Paper.

NATIONAL Cash operated by ha Secretary, Timothy

AGENTS wanted Mechanical Ai 3/4 Eden Street, Lo

PR

TO Let, small W loading), in C Druggists' Sundries Shop Fitters; low Brown Street, Manc

SIT

BIRMINGHAM.— Pharmacy. and references in f 17 Bnll Street, Birr

BIRMINGHAM.— Assistant (male Photography. Plea possible, to Vernon Birmingham.

BIRMINGHAM.— Branch Shop; Dispenser, good Wi and have experienc ments. State age, 59 Spring Hill.

BRIGHTON.—Wa or female); dresser and have fullest particulars in A. H. Preston, Che

DERBY.—Qualifie August 18-31 light duty; board-r ences, etc., to E. As

LONDON, E7.— graphic and state age, salary re Paper.

LONDON.—Junior Dispensing. G required and when

LONDON, E.C.— graphy, require Secretary, Shadfor William Street, E.C

LONDON, E.C.— ness, a smart, giving usual partic 33/7, Office of this

LONDON, S.E.— (male); age 2 man. State full pa references. Hodges

LONDON, S.E.— at once; must Photographic. Plea 167/29, Office of th

LONDON, S.W.— cation; hours 1 o'clock; no Sund particulars of exper

LONDON, S.W.— round experie and capable of wor for progressive ma and full particulars Tooting Road, S.W

MANCHESTER.— taking charg must have had a letter, age, particu Great Clowes Stree

NANTWICH, CH or five weeks no N.H.I. Dispensi state age, terms a Nantwich.

OLDHAM Indn young qualifi age, experience, an King Street, not

SOUTH WALES.—Wanted, a keen, capable young Assistant (male or female); must be good Salesman (Photographic and Counter) and Window-dresser. Apply, stating full particulars and salary required, D. Emlyn Harries, Chemist, Neath.

EXPERIENCED qualified Assistant required by third week in August for good-class Dispensing and Toilet business; quick and accurate worker, good Salesman and Window-dresser; able to take sole charge when necessary. Particulars and references to Bruce, Chemist, Westcliff.

IMMEDIATELY, for about three weeks, Assistant in good-class Retail and Dispensing, with Photographics. Applications, stating age, height, previous experience, salary required, and enclose photo (returnable), to J. Bryant, 30 Harbour Street, Ramsgate.

JUNIOR Assistant wanted for a good-class business. Apply by letter, with full particulars and salary required (outdoors), to A. B. Higgs, Chemist, Horley, Surrey.

LOCUM, unqualified, required from September 6 to 18, inclusive. State experience and salary required to Booth, Chemist, North Farnborough, Hants.

LOCUM, qualified; five weeks from August 25; local man and abstainer preferred; assistant kept. Kirkland, Chemist, Crickhowell, Breconshire.

M.P.S., over 50, bachelor, to invest a little money in and manage Country Pharmacy for unqualified widow and so enable her to register on the Panel. State salary (indoors), experience, with references. F. H. Gardam, Pharmacy, Clock Face Road, St. Helens.

QUALIFIED Chemist wanted to manage Chemistry and Drug Store to be opened shortly; state whether qualified to undertake Optical Testing; written applications at once, stating age, qualifications, experience; commencing salary £5 10s. per week. Co-operative Society, Coalville.

QUALIFIED Assistant required by middle of September or end; Welsh speaking preferred; market town; light business; hours 9 a.m. to 7.30 p.m., 1 p.m. Thursdays; age not over 45; single; abstainer; one willing to work, obliging at the counter, and first-class references; moderate salary; permanency. Photo and salary required, with references, in first letter. Apply 172/25, Office of this Paper.

QUALIFIED (male) Assistant for Counter and N.H.I. work; quick, accurate and well recommended. State salary required, age and usual particulars to W. Tate, 37 Roman Road, London, E.3.

QUALIFIED Manager, about 25 years, immediately for small branch; first-class references essential. Apply 53 East Hill, Wandsworth.

QUALIFIED Manager for branch at once, near Southampton; young; able to work up neglected business; good Prescriber and knowledge of Photography. Apply, stating salary required (outdoors) and full particulars, to "Telas," c/o Wright, Layman & Umney, Southwark Street, London.

QUALIFIED CHEMIST AND OPTICIAN.—Body's Pharmacies, Southend-on-Sea, offer progressive position to young energetic Assistant possessing Pharmaceutical and Optical qualifications; exceptional opportunity for good refractionist and one capable of merging into responsible management of branch. State experience and qualifications, age, salary required (outdoors), married or single, when disengaged, and enclose recent photo to the Principal, Body's Pharmacies, Broadway, Southend-on-Sea.

QUALIFIED Lady or Gentleman (not over 35) for Branch in good-class district; none but conscientious workers, with recent good-class experience, need apply. Give age, experience and usual full particulars in first letter. Edwards, 77 Atlantic Road, S.W.9.

QUALIFIED Assistant for branch shop in N.W. London, with a view to managership later; must be a capable and reliable man; apply with full particulars of experience, stating salary required and when at liberty. 173/32, Office of this Paper.

QUALIFIED Manager for branch near Elephant and Castle; a good opportunity for a young person to secure a progressive permanency; good salary and commission. Bennetts, Chemists, 79 Union Road, Newington Causeway, S.E.1.

QUALIFIED Manager, for good-class suburban Store Business; up-to-date Window-dressing, Photography; tactful; good prospects. Apply by letter, with full particulars, to 87/905, Office of this Paper.

REQUIRED at once unqualified Assistant; progressive position for capable man; accustomed to good Counter work and Dispensing for Medical Botanist, Norfolk; if able to invest capital position according to amount available, but not essential. Apply with references, photo, age, salary required, also amount available, if any; abstainer preferred. 172/17, Office of this Paper.

TEMPORARY Qualified Assistant (male) required, under 30. State age, salary required, etc. C. Dickinson, 119 South End, Croydon.

TWO Qualified Men wanted. Please give full particulars of experience, salary required and when at liberty to Harry E. Matthews, Ltd., Chemists, Mornington Crescent, next to Tube Station, N.W.1. Applications by letter only.

UNQUALIFIED Assistant (male), under 30, required for busy Cash Business with N.H.I., in London, S.W. State age, height, details of experience and salary required. 173/20, Office of this Paper.

VACANCY, August 16, for a qualified Chemist for General Retail and Dispensing business, S.E. district. Apply, stating experience, references and salary, to Barron, 77 High Street, Croydon.

WANTED at once, Qualified Assistant as Cover; suit lady; easy hours; no Sunday duty, for small country town, Somerset. Reply, stating wages and when at liberty, 169/5, Office of this Paper.

WANTED, Dispenser for evening work; qualified preferred. Applications unanswered in three days respectfully declined. Apply C. H. Burden, 100 Evelina Road, Nunhead, S.E.

WANTED, September 20, for good-class Chemist's business, qualified man, about 30, of good address, able to take sole charge. State experience and salary required. Richards, 92 High Street, N.12.

WANTED, at once, qualified or unqualified Assistant; must be absolutely trustworthy and competent; live out; age 30-40. Apply, stating age, salary required, references, etc., to G. E. Reall, 25 Sidney Street, Cambridge.

WANTED immediately, Junior Assistant; outdoor; three kept; hours 9 to 8; half-holiday weekly. State wages, experience, etc. Jones, Ph.C., 4 Thayer Street, Manchester Square, W.1.

WHOLESALE.

FIRST-CLASS Travellers, with established connections amongst Cutlers and Chemists, required for the following counties: Devon and Cornwall; Cardigan, Pembroke, Merionethshire; Cumberland and Durham; Bedfordshire and Northamptonshire; Ayrshire, Lanarkshire, Wigtownshire, Kirkcudbrightshire, Dumfriesshire; must have own car; liberal commission to carry nationally advertised Proprietary line; state other lines carried. Box CD.2, Travers Cleaver, Ltd., 47 Gt. Russell Street, London, W.C.1.

QUALIFIED Chemist (Perfumer) wanted; practical Perfumer able to match floral perfumes in toilet and scented soaps. Only those having expert knowledge and experience need apply to 87/907, Office of this Paper.

QUALIFIED Assistant for dealing with D.D.A. orders and keeping records; must have had good experience; excellent opportunity; permanency; send photograph. 87/906, Office of this Paper.

[COLONIAL, INDIAN AND FOREIGN.]

INDIA.—Qualified Assistant wanted; unmarried; rupees 375 monthly, with quarters or allowance; annual increment; passage paid; 4 years' agreement. Apply "EH/S" (87/903), Office of this Paper.

SHANGHAI.—Junior qualified Assistant required in English Chemists in Shanghai with high-class Dispensing and Store business; liberal salary; 4 years' agreement; second class passage. Apply by letter, giving full particulars as to experience, age, etc., to Dakin Brothers, Ltd., 82 Middlesex Street, E.1.

SINGAPORE.—Qualified Assistant required for Medical Hall, Ltd., age about 23, unmarried, with good Counter manner and experienced in Dispensing; 3 years' agreement; passage paid both ways; salary $300 per mensem first year, $325 second year and $350 in third year (dollar value 2s. 4d. stg.); healthy climate. Apply, in writing, Crawford, "Acharn," Largs, Ayrshire, Scotland.

SITUATIONS WANTED.

RETAIL.

[*HOME.*]

A CAPABLE Man; at liberty; good Stock-keeper, Salesman, Window-dresser and N.H.I. Dispenser; 13½ years as manager; married; tall; unqualified; temporary or permanent. "W.," 896 Romford Road, E.12.

A CAPABLE and reliable qualified man; sound experience; disengaged shortly; permanency or Locum. "Chemist," 85 Lancaster Road, Leytonstone, E.11.

A SCOTSMAN; unqualified; age 36; experienced Dispensing, Counter, Stock-keeping; references. Smart, 49 Erskine Street, Dundee.

AN experienced M.P.S., F.S.M.C. requires responsible position where energy and initiative will be appreciated. 173/14, Office of this Paper.

AS Manager; qualified; age 48; disengaged August 16; outdoors; London; sober and active; thorough knowledge of business; permanency desired, but Locum work accepted until suited. "Maurice," c/o Roskrow's, 103 Speldhurst Road, Bedford Park, W.

AS Locum, emergency relief; exceptional experiences of responsibility. "Capability," 229 Sumner Road, Peckham, S.E.

ASSISTANT, 22, unqualified, requires permanent position; Birmingham or suburbs; experience Dispensing, Counter, Photographic. "B.," Sunnyside, Farm Road, Sparkbrook, Birmingham.

ASSISTANT; unqualified; 23; 8 years' wide experience, Dispensing, Counter, Photography; temporary, with view to permanency; Scotland preferred; references. A. Dryburgh, 5 Co-operative Buildings, Coaltown-of-Wemyss, Fife.

ASSISTANT, 30, for Photographic Department; experienced, practical worker and Salesman; good Dispensing also. Phillips, 52 Lacey Street, Ipswich.

ASSISTANT (lady); 26; nine years' all-round experience; capable, energetic; free end of September. Hawkes, 1 Birch Villas, Sandgate.

ASSISTANT, lady (Hall), desires post, good-class Pharmacy; excellent Dispensing experience; good Counter-hand; knowledge of Photography; S.W. preferred; fullest details on application Rattenberry, 66a St. Ann's Hill, Wandsworth.

ASSISTANT; age 22; tall; good appearance; 6 years' good all-round experience in Dispensing, Counter, Photographic, and Window-dressing; disengaged September 25; passed Part I. 173/24, Office of this Paper.

AT liberty for Locum, August 15; excellent references and experience; moderate terms. "Locum," c/o Mr. Langley, Chemist, Foulsham, Guist, Norfolk.

COMPETENT, reliable; Locum or permanent; sound Counterman; disengaged; permanent, part-time engagement entertained, or Drug Store Manager; single-handed; moderate salary and commission; thorough all-round exceptional experience. "R.," 10 Foreign Street, S.E.5.

DISPENSER (Hall).—Experieuced, qualified lady seeks post, preferably in London. Miss Flint, 38 Woodland Gardens, Muswell Hill, N.10.

DISPENSER (Hall); free September; experienced Doctors and Chemists; Manchester district preferred, but not essential; whole or part time. Miss Wainwright, 15 Ruskin Grove, Bredbury, Stockport.

ELDERLY qualified Chemist; disengaged August 21; Manager branch or Locum. "Chemist," 14 Monson Colannade, Tunbridge Wells.

ELDERLY qualified man, active, reliable, desires position of trust or cover; Yorkshire preferred. 173/40, Office of this Paper.

LOCUM or otherwise or view succession; qualified; 26; Public School education; London and foreign experience; free August 7; London or Birmingham; highest references. "N.," 55 Godwin Road, Margate.

LOCUM; unqualified; 7 years' experience; competent and reliable; disengaged August 21; good knowledge, Salesmanship, Dispensing and Photography. Worthington, 19 Cross Lane, Radcliffe, Manchester.

LOCUM, Manager; qualified; elderly; experienced; August 14; references; interview; Scotchman; tall. "Chemist," 341 Great Cheetham Street East, Higher Broughton.

LOCUM; qualified; disengaged from Septcmber 6 onwards. Miss Wood, Portland Pharmacy, Creswell, near Mansfield, Notts.

LOCUM; permanency preferred; country district; unqualified; experienced; good referencnes; moderate salary; disengaged. Taylor, 2 Sulina Road, Brixton Hill, S.W.

LOCUM.—M. Smith, 96 Humberstone Drive, Leicester, permanent address; over 30 years' qualified experience; highest credentials; reliable service; disengaged August 30 to September 25. Present address: Holt's, Chemist, Scunthorpe.

LOCUM or Dispenser; August 9 to 14 inclusive; London area; experienced; speak French. Thomas, 9 Barnard Road, S.W.11.

LOCUM or permanency; London and provincial experience; capable Dispenser and Counterman; trustworthy; unregistered. "H.," Cwmiar, Llanybyther, S. Wales.

LOCUM or Manager, with good experience; excellent references. "Chemist," 39 Bradford Road, Trowbridge.

PHARMACEUTICAL Chemist, young, thorough experience, desires position with prospects of advancement; excellent references. R. Mostyn, Chemist, Carnarvon.

PHARMACIST, 28, desires a progressive position; London and provincial experience; free end September; interview. Particulars to 173/26, Office of this Paper.

PHARMACIST requires position as Manager in good-class business on or near South Coast, with view to succession; excellent experience, London and provinces; good appearance; would interview. 173/30, Office of this Paper.

QUALIFIED lady, with Counter and high-class Dispensing experience; disengaged; in or near London preferred. 172/27, Office of this Paper.

QUALIFIED Assistant; Pharmacy and Optics; height 5 ft. 11 in.; young and energetic; eight years' seaside and London experience; good references; London preferred; available immediately. Axtell 216 Banbury Road, Oxford.

QUALIFIED; disengaged August 23; age 22; seven years' experience; good Dispenser and Counterman, Photography; West End preferred; outdoors. "M.P.S.," c/o Forsey, 10 West Park Road, Kew Gardens.

QUALIFIED, 25, disengaged shortly, desires permanency; management or otherwise; 9 years' good all-round experience. "Aspirin," 16 Stockwell Park Road, S.W.9.

QUALIFIED; 52; single; Dispenser, Locum or Cover; delicate (war injury); moderate terms. "Chemist," 27 Armley Grove Place, Hall Lane, Leeds.

QUALIFIED.—Locum or Manager; disengaged; London and provincial experience; age 39; references 4½ years, 2 years and locum work. Apply "Chemist," Orchard Cottage, Gt. Hallingbury, Essex.

QUALIFIED; 30; slight war disablement; Manager or Assistant; London; interview; free August 23. Gray, 160 Old Oak Road, East Acton, W.3.

QUALIFIED, 27, desires a change shortly for good-class situation in West-End; responsible Front Counter berth preferred; good all-round experience; tactful and efficient Salesman. 173/21, Office of this Paper.

QUALIFIED, age 25, tall, desires post as Manager on the Lancashire Coast. 174/8, Office of this Paper.

RESPONSIBLE position required by M.P.S.; thoroughly reliable and experienced; disengaged September 1. 168/39, Office of this Paper.

UNQUALIFIED, middle-aged, 25 years as Managing Assistant; all-round experience, Book-keeping, etc.; disengaged. "G.," Danethorpe, Westfield Lane, Mansfield.

YOUNG lady, unqualified, 2½ years' Dispensing experience in Hospital, requires situation in or near London; good reference. Miss Lynn, 34 Waldemar Avenue, London, W.13.

WHOLESALE.

ADVERTISER seeks position as Works or Departmental Manager; practical Chemist, with special experience in manufacturing, producing and developing sales of Perfumery, Toilet lines, Soaps for home and export markets. "Thorough," 173/6, Office of this Paper.

EXPERIENCED Representative, well known London and provinces, calling upon Doctors, Chemists, Hospitals, etc., will shortly be disengaged; highest references; salary, expenses, and commission. Apply P.C.B. 32/37, Office of this Paper.

MAN aged 19, had 4 years in Laboratory of Soap and Perfumery Manufacturer; good worker. L. Gatehouse, 5 Brettell Street, London, S.E.17.

QUALIFIED Lancashire man, 23, 7 years' Retail, desires change; any offer of position in Wholesale or as Representative. "Nemo," 174/5, Office of this Paper.

REPRESENTATIVE; good connection North of England first-class house; well up in Organo-Therapy propaganda; 20 years' experience. Langworthy, Dauntsey House, Frederick Place, London, E.C.

REPRESENTATIVE open to engagement with firm of standing; first-class experience with Chemists and Doctors. 173/25, Office of this Paper.

SALES Manager and/or Traveller desires appointment; free September; experienced home and abroad; excellent connection London Chemists, Hairdressers; highest testimonials. P.C.B. 32/39, Office of this Paper.

TRAVELLER desires change; 15 years' sound connection with Medical Profession, Chemists and Institutions from Derby to Tweed, first-class firm; good credentials. "Therapy," Amalgamated Bureau, 2 Wine Office Court, London, E.C.4.

MISCELLANEOUS.

DRUG FITTINGS, glass fronted and all-glass Counters, Counter Drawers, Bent and Flat Counter Cases, Perfume Cases and Desks, Dispensing Screens, Wall Showcases, all sizes. Call and see, or write for sketches and details. 1826 to 1926. PHILIP JOSEPHS & SONS, LTD., 93 Old Street, London, E.C.1.

LIMITED COMPANIES REGISTERED. —I have now been eugaged in this work over 20 years, so you may rely that my experience in Chemist and other Companies (I take all trades) is hard to beat. Most reasonable and inclusive fee. Advice free.—A. B. SLACK, 15 Christ Church Avenue, West Didsbury, Manchester.

MAHOGANY Wallcase, 6 ft. long, £20; 6-ft. Dispensing Screen, £21; Perfume Case and Desk, 90s.; 4-ft. Counter Drawers, 90s., 5-ft. Plate-glass Counter Case, 90s.; 10-ft. Glass-fronted Serving Counter, £17; 12-ft. Mahogany Drug Fitting, £27; large stock of Showcases, Shopfittings, Counters, Dispensing Screens, Silent Salesman, Countercases, Shoprounds, Counter Drawers, etc., at lowest prices. Percy R. E. Josephs, 232/8 Bishopsgate (first floor), London, E.C. 2 (only address). 'Phone: Avenue 1194.

MAHOGANY FITTINGS.—Drug Fitting, 14 ft. long, 48 drawers, glass labels; Wall Cases, 10 ft. and 8 ft. long; Dispensing Screens, 7 ft. and 6 ft. long; glass-front Counters, 12 ft., 10 ft. and 8 ft. long; Silent Salesman, 6 ft. high; Perfume Case and Desk; two 4 ft. nests Counter Drawers; low prices. GEORGE COOK, Shopfitter, 267 City Road, E.C.1.

SECOND-HAND CHEMISTS' FITTINGS.—We have an exceptionally fine selection of these in all sizes; prices are right, and goods are in first-class condition; we shall be pleased to supply particulars and prices. Call or write, RUDDUCK & CO., 262 Old Street, London, E.C.2.

SHOP FITTINGS (Second-hand).—We have a large range of Chemists' Fittings, both in oak and mahogany, which can be easily adapted to suit any Pharmacy. Write your requirements. H. MILLS & SONS, LTD., Shopfitters, 163-5 Old Street, London, E.C.1.

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12 PAIRS FORCEPS, good condition, 35s.; bargain. "Dental," 135 Queen Street, Newton Heath, Manchester.

WANTED.

GOWER, Chemists' Bookseller, 41 Voltaire Road, Clapham, wants Pharmaceutical Books and Students' Requisites.

Printed for the Proprietors by The Avenue Press (L. Upcott Gill & Son, Ltd.), 55 to 57, Drury Lane, W.C.2. and Published by the Proprietors, Morgan Brothers (Publishers), Ltd., at 42 Cannon Street, in the City of London.—August 7, 1926. [68]

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